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Lighting the Office

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CORRECT office lighting can often be attained at a minimum expense, and more than pay for itself in the resultant greater efficiency and improved morale.

IT is often said regarding tricks of magic that the hand is quicker than the eye. However, a moment's reflection reveals that the hand developed its skill through training by the eye. The hands of the office worker are piloted through their skillful pursuit from the visual control tower. On and on from the waking hour two spherical orbs in perfect teamwork wheel, rise and scan as they transmit the intricate detail of the picture that lies before them. This picture is assembled in the brain at the base of the skull and all the reasoning processes are brought to bear upon it in analysis, judgment and decisions for action. As action proceeds, the details of the picture change and the reasoning keeps on apace. The value of the worker depends upon the development of a high degree of coordination between the component parts of the human organization—the visual receiving department, the intelligence section and the administration of muscular activity. Psychological techniques are now producing improved methods of training and developing the skills of brain and muscular coordination. This paper discusses what can be done to promote optimum functioning of visual perception. This can be approached from two viewpoints: (1) the influence of the environment, (2) the conditioning of the eyes themselves, or what might be called the sharpening of the visual tools.

Light and Sight

Without light there can be no sight. Some tasks require little light and others more. Some tasks involve seeing large objects in moonlight while others involve fine detail and poor contrast. The

ability to see objects depends upon their size, the contrast with the background and brightness of the object. Also, the ability to see objects quickly depends upon their brightness. Perception depends not only upon size, contrast, time allowed and brightness of the object, but also upon the relative brightness of the areas surrounding the object. This surrounding brightness can favor or depress visual performance.

General Services Administration photo.

Too much brightness contrast.

The brightness of objects depends upon the illumination falling upon them. Some are dark and reflect only a small portion of the incidental illumination. In order to reflect enough light to the eye for quick, accurate perception a large amount must be thrown upon these.

Design of Luminous Environment

In the early days of artificial illumination, the lighting engineers thought only of how to conserve the little light emitted and to direct it carefully to the work to be seen. They ignored the effect of the rest of the room. They placed a light meter at the work and if it read the

meager amount which could be expected in terms of their attained efficiency of light control, they were gratified. However, the dark rooms with heavy shadows and overly bright lighting units were an uncomfortable and inefficient seeing environment. With the development of improved and economical lighting and as a result of researches throughout the world on the comfort and efficiency of seeing, the lighting engineer has come to realize that he must design for the whole

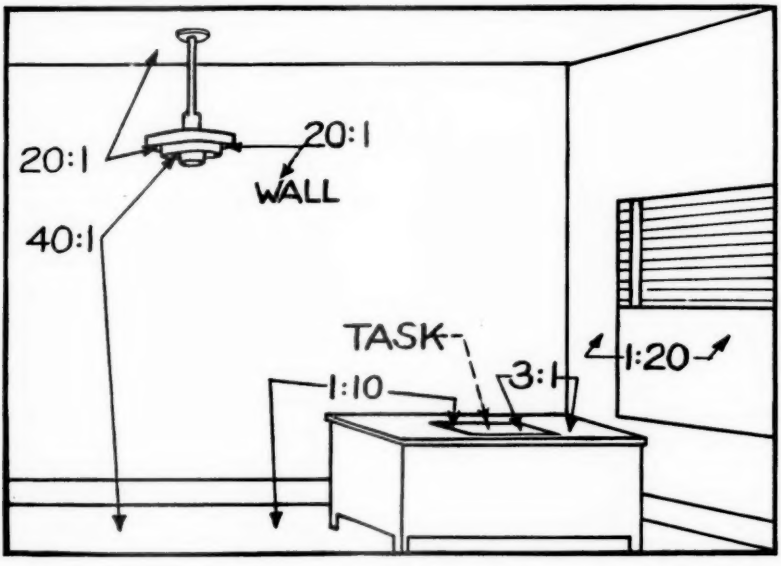
General Services Administration photo.

Brightness contrast improved through good use of light and color.

environment. He must not only design an efficient environment, but he must bring about a pleasing, livable interior. He has come to realize the necessity for a proper balance among the brightnesses of all the areas in the field of view. He must also think in terms of color as a means of effecting a pleasant interior.

The office worker has two main fields of view, one for "heads down" tasks and one for "heads up" tasks. As one looks down on his desk, his view is largely occupied by the immediate work and the desk, with possibly some floor just beyond the desk included. Scientists have established the fact that visual acuity and sensitivity to contrast are maximum when the brightness of the surroundings

is equal to that on the work. However, it is difficult to produce and maintain desk surfaces which are light enough in reflectance to match the paper work on the desk. It is therefore fortunate that nearly maximum visual efficiency can be maintained under conditions in which the brightness of the surroundings is only ⅓ that of the task. This can be easily accomplished by having light desk tops with natural wood finishes or by using light linoleum. Desk grade linoleum is now available in light green and tan colors having reflectances of about 30 per cent. As compared with an average of 65 per cent for paper work, the 1 to ⅓ ratio is easily met.



Recommended brightness ratios.

Care should be taken to avoid glossy surfaces. Daylight and artificial lighting unit reflections will prove distracting and even glaring in glossy desk tops and office equipment.

"Heads up" view is thought of as that in which one looks horizontally through the office. If one is looking critically at chalkboard charts or wall displays, the same rule of 1 to ⅓ ratio of brightness of the task versus its surroundings should hold. Should the critical visual tasks be confined to the desk areas the brightness ratios between the task and the more remote surroundings as viewed when one looks up from the desk can be somewhat greater. The following table of

limiting brightness ratios is taken from the *Recommended Practice of Office Lighting**:

Recommended Brightness Ratios

Brightness ratios of areas of appreciable size from normal viewpoints should not exceed:

3 to 1 between tasks and adjacent surroundings,
10 to 1 between tasks and more remote surfaces,
20 to 1 between lighting fixtures (or windows) and surfaces adjacent to them,
40 to 1 anywhere within the normal field of view.

These ratios are recommended as maximums; reductions are generally beneficial.

The Rôle of Color

While light finishes are recommended for all room surfaces to improve the balance of brightness for efficient seeing, the use of white or a single color can produce a very monotonous effect which may result in fatigue followed by an all-over feeling of distress and irritability. If a worker has his eyes glued upon one color for a long period of time the nerve endings begin to demand the complementary color, a physical phenomenon sometimes actually causing spots before the eyes. But a mere splashing of colors around is not the answer; in fact, it may even lead to more distress. The working environment should be an integrated whole. Selection of one object or theme to furnish a key to the atmosphere desired sets the pattern for a combination of colors.

Psychologists tell us that the colors surrounding us influence our moods. Some colors quicken our muscular and mental powers while others are relaxing. It was proved during the war that the judicious use of color in factories resulted in increased quantity and quality of production, fewer accidents and higher morale of employees. Modern science has simplified the use of color and dispelled most of the mystery of color harmony.

Colors like red and yellow which are related to heat are called warm and tend to advance toward the eye. Cool colors are soothing and tend to recede. Light shades give the illusion of greater size, while

* Illuminating Engineering Society, July, 1947.

dark areas appear small. All ceilings should be painted white or a very light shade (high reflectance) of the wall color. Large expanses of wall should be finished in weak or low tones of color. Strong colors should be used only on small areas. Painting rest rooms, cafeterias, and hallways in gay colors gives the employees a lift during free periods.

The color of the light has a psychological effect also. Daylight lamps, for instance, provide high illumination without developing a feeling of heat and high brightness. Conversely, the use of "daylight"

Good use of light and color for eye comfort.

light fixtures to provide low values of illumination may result in a dull and gloomy appearance, whereas sources of warmer character will generally be satisfactory in this regard. One principle which results in decoratively pleasing rooms is to select a cool color where the predominant illumination in a room is warm and to pick a warm color where the prevailing light rays are cool.

Daylighting

In most offices the levels of illumination recommended above will be obtained in part during the day from natural lighting admitted

through windows. However, because of the great brightness of the sky, windows are usually sources of direct glare and, therefore, should not be in the direct view of the office worker. Some provision should be made for shielding the glass areas at times when they may become excessively bright. Window shades or Venetian blinds are generally used to protect office occupants from direct window glare and permit greater freedom in personnel orientation. Translucent shades transmit a large part of the incidental light diffusely, but if too transparent may themselves become objectionably bright. When roller shades are used it is desirable to mount two rollers at the center, the shades overlapping, one to be rolled up, the other down. Some new office buildings are constructed with overhangs or baffles outside the windows to cut out the direct sunlight but at the same time admit skylight to the interior. Directional glass block redirects incidental light and improves the distribution across the rooms. Clear glass windows have the psychological advantage of permitting workers to look at distant objects, thereby releasing accumulated eye muscle fatigue. Buildings using directional glass block often have clear glass vision strips at eye level to permit the occupants to look out.

An artificial lighting system which can provide the recommended illumination is always necessary, however, since the daylight is constantly changing, varying with weather conditions, the time of day, and season of the year.

How Much Light is Needed

The amount of light necessary for a given office task depends upon the *size* of the detail to be discerned, its *contrast* with background and the *time* available for viewing. The reading of large black type on good quality white paper requires less illumination than reading fine print, handwriting, penciled notes, carbon copies or colored office forms. The transcription of penciled shorthand notes is an everyday example of a poor contrast task which must be viewed rapidly and therefore requires a high level of illumination. Bookkeeping and drafting are very difficult visual tasks since they involve fine detail work for long periods of time.

The accompanying table, taken from the Illuminating Engineering Society's *Recommended Practice of Office Lighting*, lists recommended footcandle* levels based on the difficulty of the various groups of see-

*A footcandle is the amount of illumination produced by one standard candle on the surface one foot from the flame.

	Footcandles, Current Recommended Practice
Difficult Seeing Tasks	50
Involving:	
(a) Discrimination of fine details such as 6–8 point type	
(b) Poor contrast	
(c) Long periods of time	
Such as:	
Auditing and Accounting	
Business Machine Operation	
Transcribing and Tabulation	
Bookkeeping	
Drafting	
Designing	
Ordinary Seeing Tasks	30
Involving:	
(a) Discrimination of moderately fine detail such as 8–12 point type	
(b) Better than average contrast	
(c) Intermittent periods of time	
Such as:	
General office work (except for work coming under "Difficult Seeing Tasks" above)	
Private Office Work	
General Correspondence	
Conference Rooms	
Active File Rooms	
Mail Rooms	
Casual Seeing Tasks	10
Such as:	
Inactive File Rooms	
Reception Rooms	
Stairways	
Washrooms, and other service areas	
Simple Seeing Tasks	5
Such as:	
Hallways and Corridors	
Passageways	

ing tasks and the current general cost of lighting. The values should be maintained in service by proper cleaning of lighting equipment, replacement of depreciated or failed lamps, and maintenance of high reflectance room surfaces. Initial values should be greater by a percentage sufficient to compensate for unavoidable depreciation.

Eye Accidents to School Children*

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National Society for the Prevention of Blindness

DISCUSSES the most frequent causes of eye injuries to school children and recommends the need for concerted safety education program for the community, the school and the parents, as well as for the school children themselves.

THE story of a freak accident ranks high in news value. It makes an arresting headline. Unfortunately, the very fact that only such incidents are featured in the news lends support to the comfortable but unwarranted belief that practically every accidental injury is the result of some unusual and totally unforseeable circumstance. But accidents don't happen that way, or at least not often! This can be proved by analyzing case stories of accidents to find the place of occurrence, the nature of the activity, the methods and objects or instruments used, and the characteristics of the persons involved. We can readily identify the hazardous elements and show how these *may be foreseen and avoided.* With this objective, the National Society for the Prevention of Blindness has, from time to time, analyzed the causes of eye accidents to provide a factual basis for a constructive eye safety program.

At this time we present facts concerning eye accidents to children of school age. These facts are derived from a study of accident records kept over a period of 17 school years by the school system of Louisville, Kentucky, and are believed to be an exceptionally good sample. Although about 200 school systems have supplied reports on student accidents to the National Safety Council for periods of one year or more during the last two decades, detailed case records of the type needed for our study are not available from other cities. Moreover, the City of Louisville has done an unusually conscientious job of reporting

* The National Society for the Prevention of Blindness wishes to acknowledge its indebtedness to the Department of Safety and Special Education of Louisville, Kentucky, Public Schools, for providing the accident records used in this study, covering a period of 17 school years.

accidents of its school children, not matched in other places, some of which do not attempt to cover incidents occurring away from the school plant. The Louisville data should give a better picture of the eye accident situation than could possibly be derived from averaging data from several less complete sources.

Accident Reports

In the school safety program a reportable accident is one which requires a doctor's attention or causes absence from school of one-half day or more. For the purpose of this study, all accidents affecting the eyeball or the eyelids, eyebrows, or other areas surrounding the eyes, as well as head or brain injuries affecting the eyes were classified as eye accidents. The study covers students from kindergarten through the 12th grade, for the period from 1931–32 to 1947–48, inclusive. Since school personnel are not available for recordkeeping during the summer vacation periods, all data are for a school year of nine months only. However, the Louisville records include cases occurring at home, on the streets, as well as those on school premises, so that all types of hazard are represented in the data.

Since our data come from a school system having a good eye safety program, the figures tend to give an unduly optimistic picture. The rates for the entire country would probably be considerably higher—how much higher we have no way of estimating.

Eye Accident Rate

During the 17 school years covered in the study, 1,996 eye accidents, or an average of 117 per year, were reported. It is to be noted that about midway in the period of the study the method of counting students on the school rolls was changed from "enrollment" (total students enrolled at any time during the school year), to "membership" (only those actually on the active rolls each month). The frequency rate of eye accidents, computed on the basis of total enrollment of approximately 40,000 students was 2.5 per 1,000 per year. If "membership" is used as a base, the frequency rate becomes 2.9 per 1,000 students from the kindergarten through the senior high school grades. At first glance these figures appear almost negligible. However, as mentioned before, Louisville's active safety program tends to keep its rate low. Moreover, even using the lower rate and assuming that eye accident rates are no higher elsewhere, the number of eye accidents to school children in the United States at this rate would be almost 66,000 during any nine-month school year—a figure which is definitely not negligible.

Severity of Eye Accidents

While the 15 per cent of eye injuries requiring medical attention only and the 36 per cent involving lost time of one day or less were obviously minor injury cases, more than one out of eight of the total cases are serious. These are the cases requiring more than one week's absence from school and cases in which the possibility or certainty of

SEVERITY OF EYE ACCIDENTS*

	Number	*Per Cent of Total*
Total eye accidents—17 school years	1,996	100.0
Eye accidents, by number of days lost from school		
No time lost, but medical attention required	297	14.9
Lost time—1 day or less	716	35.8
Lost time—2 to 5 days	731	36.6
Lost time—over 5 days	247	12.4
Lost time—remainder of school year	4	.2
Lost time—not reported	1	.1
Total school days lost	6,119	..
Eye accidents involving serious injury†	253	12.7
Eye accidents involving permanent total disability of one eye†	23	1.2

* Based on study of accident records kept over a period of 17 school years by Louisville Public Schools, Kentucky.

† Eye accident record forms did not include any item indicating specifically the extent of disability. Therefore, all cases involving lost time of more than one week and those in which permanent disability was mentioned or implied were counted as serious; and cases in which specific mention was made of removal of an eye, loss of vision of an eye, or withdrawal from school because of the eye injury were classified as permanent total disability of one eye.

some permanent disability was recorded. As information on this point was not called for in a specific item on the record form, the extent of permanent partial disability is not definitely known in all cases. However, it is significant that in 23 cases mention was made of removal of an eye, or loss of sight of an injured eye, or withdrawal from school because of the eye injury. Moreover, the records indicate that for every case in which total loss of sight of an eye was specifically mentioned, there were at least three in which some serious impairment might be implied by statements such as, "eyeball pierced by arrow"; "brother threw fork in eye—severe eye injury"; "shot through eye with shotgun"; "run over by truck—fractured skull, eye injury"; "fell, running—stick in eye—out 50 days"; "fell from window, skull fractured, eye affected."

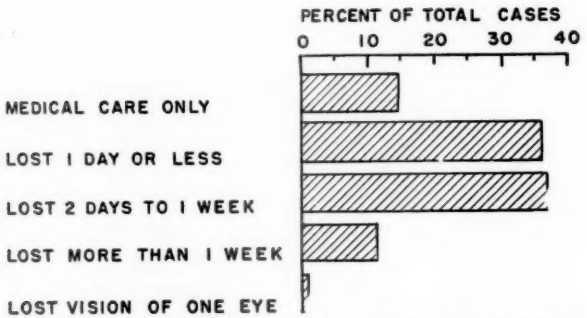
If the experience in Louisville is typical, of the 66,000 eye accidents occurring in the United States, approximately 750 children are losing

the sight of one eye every school year; 2,250 suffer some permanent defect of lesser degree; and more than 6,000 additional students have potentially serious eye injuries.

The actual time lost from school due to eye injuries averaged 3 school days per case, or a total of 360 days per year. This is equivalent to a full year's absence of more than two children. If time lost by all school children in the United States is estimated from this sample, we find that the total time lost would be over 200,000 school days, or the full time of over 1,100 school children.

Although these figures are admittedly only estimates for the United States, based on the Louisville experience, they do bring the problem into perspective, so that we can appreciate the importance of an adequate program of prevention.

SEVERITY OF EYE INJURIES TO SCHOOL CHILDREN



Based on study of accident records kept over a period of 17 School years by Louisville Public Schools, Kentucky.

Place of Accident

Annual summaries of the student accidents recorded by all reporting school systems are presented routinely by the National Safety Council in its bulletin, *Accident Facts*. The tables showing distribution of injuries by the location in which they occur indicate that school and non-school accidents each account for about half of the accidents, but mention is usually made in the text analysis of the fact that non-school accidents are incompletely reported. The probable extent of the incompleteness is shown in the data from Louisville. In that city, non-school accidents, occurring during the months schools are in session, account for approximately 75 per cent of the total cases, or three times the number occurring under school jurisdiction (i.e., in school buildings or grounds and going to and from school). This fact is

further illustrated by the data in the table showing accident rates per 1,000 students per year. Here we see that Louisville apparently has an accident rate which is nearly twice the rate for all schools (38 vs. 21 per 1,000), but that the difference occurs in "Home" and "Other" accidents only.

STUDENT INJURIES BY PLACE OF ACCIDENT*

Location	*All Schools Reporting to National Safety Council 15 Years*	*Louisville, 17 Years*	
		All Accidents	*Eye Accidents*
	Per cent of total cases		
School building	20.9	10.9	11.3
School grounds	18.0	10.7	10.9
Going to and from school	7.3	3.9	4.5
Home accidents†	23.8	32.6	15.5
Other accidents†	30.0	41.9	57.8
Total	100.0	100.0	100.0
	Accident rate per 1,000 students per year		
School building	4.3	4.1	.28
School grounds	3.7	4.1	.27
Going to and from school	1.5	1.5	.11
Home accidents†	4.9	12.4	.39
Other accidents†	6.1	16.0	1.43
Total	20.5	38.1	2.48

* Based on study of accident records kept over a period of 17 school years by Louisville Public Schools, Kentucky.

† Louisville's accident rates for certain categories appear higher than average. This difference is due to more conscientious reporting of cases occurring away from school and does not reflect a poor safety record in that city.

The data for eye accidents in Louisville show approximately the same distribution by place of accident, except that "Home" eye accidents appear to be much less frequent than "Home" accidents in general. It is possible that some of this difference may be apparent rather than real, since in classification of eye accidents, cases occurring out of doors in the vicinity of the home but in which the house, porch or home yard was not specifically indicated were not attributed to home jurisdiction, a policy which may not have been followed in classification of all cases in Louisville.

To be strictly fair and accurate, an analysis of cases by location should be weighted by the relative amount of time spent in each place. Data to make such an analysis are lacking in this study.

DISTRIBUTION OF STUDENT ACCIDENTS, BY LOCATION*

Location and Type	Per Cent of Total Cases		Per Cent Eye Accidents to Total Accidents
	All Accidents	Eye Accidents	
School Building	*10.9*	*11.3*	*6.8*
Classrooms and auditorium	1.3	1.9	9.7
Laboratories and domestic science	.3	.3	6.7
Vocational shops	1.2	2.7	14.9
Gymnasium			
Basketball	1.1	.9	5.8
Other	3.0	1.7	3.6
Swimming pool and showers	.3	.3	6.7
Dressing, wash rooms, lockers	.4	.4	6.6
Corridors	.9	.6	4.1
Stairs and stairways	1.7	.6	2.4
Other building	.7	1.9	18.5
School Grounds	*10.7*	*10.9*	*6.6*
Apparatus			
Swings	†	†	..
Slides and teeters	†	..	..
Bars	†	†	..
Other	†	†	..
Athletics			
Baseball	1.7	2.3	8.6
Football	2.2	1.2	3.3
Soccer and track	1.0	.1	1.0
Other organized activities	2.0	2.2	7.2
Unorganized activities			
Running	1.0	2.4	15.3
Scuffling	.4	.3	4.5
Other falls	.5	.4	4.9
Other	1.8	1.9	7.0
Going to or from School	*3.9*	*4.5*	*7.6*
Motor vehicle—bicycle	.1	..	..
Other motor vehicle	1.3	.5	2.5
Other bicycle	.2	.4	17.3
Other	2.3	3.6	10.0
Home Accidents	*32.6*	*15.5*	*3.1*
Falls	12.1	4.6	2.4
Burns, scalds, explosions	3.7	1.9	3.4
Cuts and scratches	8.2	2.8	2.3
Other home accidents	8.6	6.2	4.7
Other Accidents	*41.9*	*57.8*	*9.0*
Motor vehicle—bicycle	.7	.7	6.5
Other motor vehicle	6.8	4.1	3.9
Other bicycle	2.5	3.0	7.7
Other street and sidewalk	12.5	39.6	20.5
Playground (not school)	4.4	2.7	4.0
Other places	15.0	7.7	3.4
Total—per cent	100.0	100.0	6.5
Number (17 years)	30,657	1,996	..

* Based on study of accident records kept over a period of 17 school years by Louisville Public Schools, Kentucky.

† Less than 0.1 per cent.

When accidents are distributed by location, as classified in the National Safety Council's summary, it is seen that eye accidents occur in practically all locations, but some appear to be more hazardous than others. By far the greatest number occur in places which the children select for free play (street and sidewalk, 40 per cent). Eye accidents, in proportion to all accidents, are most numerous in the vocational shops and the classrooms and auditorium within the school buildings; in unorganized activities involving running and in baseball on the school grounds; in bicycling and other activities going to and from school; and, as mentioned above, in play on the streets.

Activities and Instruments

The items providing the best clue to the eye hazards to which children are exposed are those which describe what the student was doing at the time of the injury and the specific object or the process which actually injured the eye. Detailed analysis of these two factors is a special feature of the present study. The study revealed, first, that eye accidents to children occur most frequently in play or sport—67 per cent of the total cases. This figure is twice the combined total for all cases occurring in household activities (8 per cent), in traffic (8 per cent), in school activities (7 per cent), and in all other activities (10 per cent).

ACTIVITIES AND INSTRUMENTS CAUSING EYE INJURY*

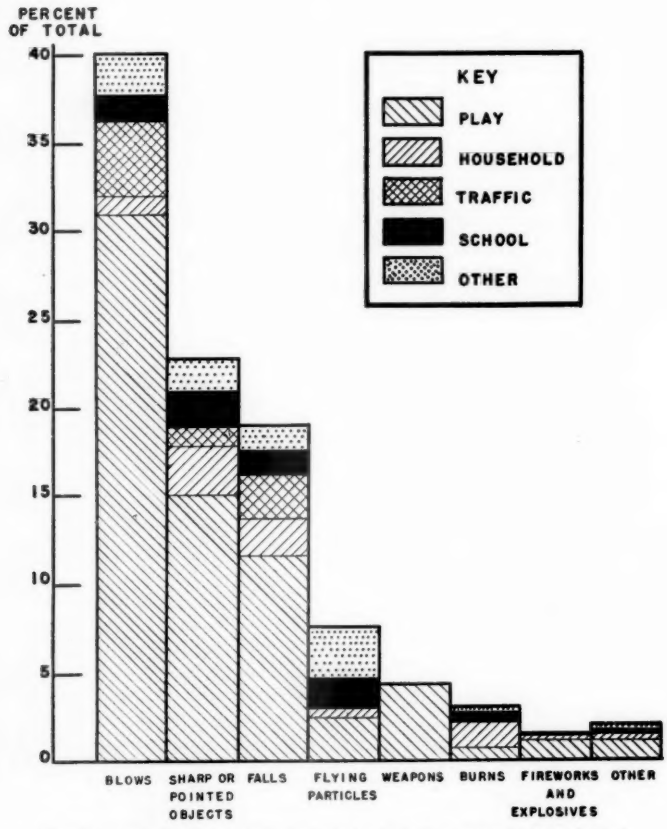
Agency or Instrument Causing Injury	*ACTIVITY*						*Total—All Activities*	
	Play or Sport	*Household*	*Traffic or Transport*	*School (excl. gym.)*	*Industry*	*Other and not Specified*	*Number*	*Per Cent*
Blows	31.0	1.0	4.3	1.4	.2	2.2	800	40.1
Sharp or pointed objects	15.0	2.7	1.0	2.1	.1	1.9	455	22.8
Falls	11.5	2.2	2.5	1.1	†	1.6	378	18.9
Flying particles	2.4	.5	..	1.8	†	2.8	149	7.5
Weapons (firearms, BB guns, slingshots)	4.3	..	..	..	..	..	85	4.3
Burns	.7	1.4	†	.5	..	.3	58	2.9
Fireworks	.1	..	..	..	..	..	2	.1
Other explosives	1.1	.2	†	†	.1	..	28	1.4
Other and not specified	1.2	.3	..	.2	..	.3	41	2.0
Total—Number							1,996	
Per cent	67.3	8.3	7.8	7.1	.4	9.1		100.0

* Based on study of accident records kept over a period of 17 school years by Louisville Public Schools, Kentucky.

† Less than 0.1 per cent.

Our big problem is, therefore, to find effective methods of teaching children to play safely. Its solution is made more difficult by the fact that three out of four eye accidents in play occur when the children are unsupervised—not on playgrounds or in organized games. More

ACTIVITIES & INSTRUMENTS CAUSING
EYE INJURIES TO SCHOOL CHILDREN



Based on study of accident records kept over a period of 17 School years by Louisville Public Schools, Kentucky.

playgrounds and recreation leaders would undoubtedly help. If safety on the playgrounds could be given emphasis comparable with fair play and skill it might be expected to have some carry over into the children's unorganized play as well as into home and school activities.

Objects Causing Eye Injury

To learn the hazards which must be controlled if we are to reduce eye accidents we must examine the listing of instruments causing these injuries.

Blows.—Four out of ten eye injuries are caused by blows—the eye is struck by or strikes against some object, such as a rock, ball, bat, fist, foot, head, tree, chair, door. In every case the force of the blow, the weight and texture of the object, and the part of the eye struck determine the nature and degree of the injury. Often a blow that would pass almost unnoticed if any other part of the body were hit will injure an eye badly. Hence, there is need to point out such dangers to eyes as: (1) rocks thrown or clubs wielded either in fun or in anger; (2) hard balls and bats used where bystanders may be too close for safety; (3) the rough and tumble play in which fists and feet lash out in all directions; (4) reckless speed in running, skating, when speed and direction cannot be controlled to avoid collision with objects or other persons; (5) leaving closet doors open; and (6) playing where there is danger of being struck by an auto.

Sharp Objects.—Second in frequency are the eye injuries due to sharp or pointed objects. More than one out of five of the total eye injuries were caused by such objects and, for the more serious cases, the ratio is more than one out of four. Children often select pointed sticks as playthings. It is part of the game to brandish them toward the faces of playmates and to run around with sticks poised so that they are almost certain to enter the eye if the child falls. Wires, knives, scissors, and even pens and pencils may cause similar injuries.

Can children be taught that such things are so hazardous to eyes that they should not be chosen as playthings? Can they be taught that when pointed objects are handled or carried for ordinary use care must be exercised to see that they will not be directed toward the eyes?

Falls.—Another very important cause of eye injury is a fall. Falls were responsible for nearly one out of five eye injuries. In falling, a child may strike his eye against hard pavement or steps, causing a cut, bruise, or abrasion. Even more serious is the fall which causes a head injury sufficient to injure the brain and affect the optic nerve. Leaning out of a window, risking a dangerous climb, tripping on stairs or over unnoticed obstacles are some of the ways in which children fall. It is probably that the child is unaware of the hazard of his position until something happens because his attention is focused on some objective in his own activity. Can we find a means of encouraging children to exercise caution without reducing the fun and adventure of their play?

Foreign Bodies in the Eye.—In more than seven per cent of cases eyes were injured by small particles, usually described as "foreign bodies or flying particles." These may be specks of dust, coal, or other material, blown by the wind, or particles of metal or wood thrown off by some metal or woodworking machine or tool at a school or home workbench. The latter type of case can be prevented by providing eye-protection devices such as are used in industry. Instructors in vocational shops and laboratories in the schools should integrate the teaching and demonstration of the principles of industrial safety into their courses.

Fireworks and BB Guns.—The study shows only two cases of eye injury due to fireworks, both fortunately involving only minor injuries, were reported for the entire 17 years. This is no doubt due to the fact that the Fourth of July falls outside the school year. It is well to remember therefore that a low rate of eye injuries due to this cause may be expected only in states in which the sale and use of fireworks is forbidden by law. The figures show no evidence of similar control legislation to cover use of air guns, BB guns, slingshots, bows and arrows—a group of items, often erroneously labelled "toys," which are a serious hazard to eyes. They accounted for 17 per cent of the more serious cases. There is no longer any excuse for permitting children to play with such dangerous things. In several states they have been prohibited by law.

It scarcely seems necessary to point out that children should be protected from explosives, chemicals, and from fire or hot substances. Somehow they must be made to understand, without personal experience, that it is dangerous to hit a dynamite cap with a hammer, to pour anti-freeze or gasoline on a fire, to mix or heat chemicals, to stand near a stove where hot fat or other foods may spatter.

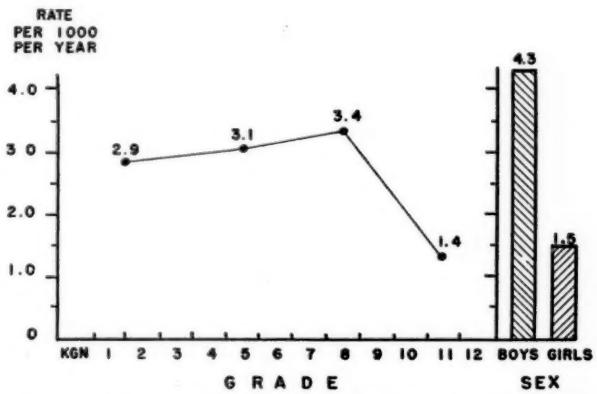
Sex and Age as Factors

To anyone who has watched children play it will scarcely be a surprise to learn that the eye accident rate is much higher for boys than girls. While the numbers in the two sexes attending school are evenly divided in Louisville, the boys had about 75 per cent of the eye accidents, the girls only 25 per cent—a ratio of three to one. It is the boys who engage in battle with the very realistic guns, arrows, or those handy substitutes—sticks, stones, or fists; it is usually they who venture into dangerous places and travel at reckless speed.

The study revealed that the eye accident rates by grade groups were 2.9 per 1,000 for the kindergarten through third grade; 3.1 for grades 4 through 6; and 3.4 for junior high school grades (grades 7 through

9). The incidence falls sharply to 1.4 in the senior high school grades (grades 10 through 12). The latter figure is encouraging because it seems to indicate that children do eventually absorb the lessons of safety.

EYE INJURIES TO SCHOOL CHILDREN
BY GRADE AND BY SEX



Based on study of accident records kept over a period of 17 school years by Louisville Public Schools, Kentucky.

Conclusions

The two most obvious facts learned from this study of eye injuries to school children are that the number is large enough to warrant attention and that the problem of prevention is not one which can be solved by any single, simple procedure. We must, therefore, approach our objective from all angles. The most important of these are:

1. Concerted action by interested groups, such as teachers, health, welfare and safety workers, as well as parents, to obtain adequate legislation and enforcement in every state, prohibiting use by children of fireworks and weapons (including air rifles, BB guns, bows and arrows, slingshots).
2. Community action to provide adequate recreational facilities and supervision which will take the children off the streets and lessen their chances of improvising unsafe play and using dangerous makeshift playthings.
3. Education of parents, teachers, and children to an awareness of the types of activities and objects that constitute hazards to eyes.
4. Stimulation of safety consciousness in children through their participation in clubs, safety contests, poster and essay contests, surveys, and similar activities.

Retrolental Fibroplasia*

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PRESENTS the theory of the possible influence of postnatal metabolism as a factor in control of this eye disease.

IN recent years ophthalmologists have become alarmed by an apparently new disease, retrolental fibroplasia, that has become one of the chief causes of blindness in preschool children. Because of the increased incidence of retrolental fibroplasia and the severe loss of vision it produces, it has also become a pressing problem to obstetricians and pediatricians, and particularly to those interested in public health.

Nature of the Disease

Retrolental fibroplasia produces extensive destructive lesions in the eye which almost completely disrupt the normal structures and produce blindness. In the fully developed case, a vascularized grayish membrane forms behind the lens of each eye. The growth of the entire eye is arrested. The cornea remains small and the anterior chamber very shallow. Usually, adhesions develop posteriorly between the iris and lens, and anteriorly between the iris and cornea. As a rule elongated ciliary processes can be seen in the far periphery of the pupillary space in front of the grayish retrolental tissue. Occasionally the intraocular tension increases, giving rise to a secondary glaucoma that produces further destruction of vision.

Incidence

The incidence of the disease retrolental fibroplasia has increased markedly since 1940.[1] Apparently this cannot be accounted for en-

* Presented before the Maternal and Child Health Section, American Public Health Association, October 26, 1949, and published simultaneously in the *American Journal of Public Health*, April, 1950.

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tirely by an increased survival of premature infants. The incidence of the disease varies somewhat in different localities.[2] The most significant fact known about retrolental fibroplasia is its association with prematurity. It rarely, if ever, develops in an infant born at full term. The incidence of the disease is in direct ratio with low birth weight. The disease seldom occurs in an infant whose birth weight is above 4 to 5½ pounds. The average incidence (computed from our own figures and those reported by Kinsey) is about 8 per cent in babies whose birth weight is between 3 to 4 pounds. The incidence is twice as great, about 16 per cent, in infants whose birth weight is less than 3 pounds.

In a recent publication, Dunham[3] has estimated that about 150,000 premature infants are born in the United States each year. According to the reported fatality rates, approximately 4 per cent or 6,000 of these weigh less than 1,000 grams at birth, and about 15 per cent or 900 may be expected to survive. Approximately 7 per cent or 10,500 of the total number of premature babies born weigh between 1,000 to 1,500 grams and, of these, 60 per cent or 6,300 may be expected to survive.

If 16 per cent of the surviving infants in the first group and only 8 per cent of the surviving infants in the second group develop retrolental fibroplasia, approximately 650 cases of retrolental fibroplasia are to be expected in this country each year. This estimated number may be somewhat higher than the true figure, since the only available reports of survival are those from large hospitals where excellent facilities are available for premature care. Even if this figure is somewhat high, if the incidence continues, the increasing number of blind children will soon constitute a major public health problem.

Theories Regarding Retrolental Fibroplasia

Retrolental fibroplasia was first brought to public attention by Terry[4] of Boston, who described the appearance of the disease in its late stages. Reese and Payne[5] in New York and Krause[6] in Chicago later described cases they had observed in the end stages of the disease.

In the earlier literature, there was considerable difference of opinion as to the nature and origin of the membrane behind the lens, which seemed to be the main factor in the disease. Terry thought the abnormal membrane arose from a persistence of the embryonic blood vessels which nourish the lens in the growing fetus, the *tunica vasculosa lentis*. Reese and Payne extended this idea by suggesting that the retrolental membrane arose from the abnormal persistence and hyperplasia of the

first embryonic vitreous formed in the development of the fetal eye, the primary vitreous. Krause thought the defect arose from a generalized maldevelopment of both the cerebral and ocular neuroectoderm occurring during the early stages of fetal life.

Krause, and Reese and Payne, thought the disease was present at birth, differing from Terry, who believed the disease developed after birth from the abnormal persistence of the embryonic blood vessels to the lens.

The main reason for the difference of opinion as to the nature of the disease arose because the earlier reports had been limited almost entirely to clinical and pathological examinations, made when the disease was far advanced. No observations had been made on the course of the disease. No one had seen where the disease started, when it first began, the structures primarily involved, or how the disease progressed.

Need for Early and Frequent Observation

When we first became interested in retrolental fibroplasia it seemed obvious that the first step to be taken was to observe the onset and course of the disease, in an attempt to settle some of the confusing questions that had been raised by the earlier reports. To find out when the disease starts, the structures primarily affected, and how the disease progresses, it was necessary to make observations on prematurely born children shortly after birth and to continue the observations periodically until the disease reached the end stages described by the previous investigators.

In July, 1945, we began to examine the eyes of all premature infants with birth weights of 2,000 grams or less, admitted to the Johns Hopkins Hospital. The eyes of each infant were examined at weekly intervals from birth.

Since the beginning of our observations on premature infants, we have repeatedly observed the onset and course of retrolental fibroplasia. We found that the disease occurs in about 15 per cent of the infants with birth weights of 1,360 grams (3 pounds) or less. The disease is not present at birth, as some of the earlier writers on the subject had postulated. No differences can be found on early examination between the eyes that subsequently develop retrolental fibroplasia and those that do not. In the cases that subsequently develop retrolental fibroplasia, early observations show the size of the eye, the cornea, the anterior chamber, the iris, and the lens to be entirely normal. No abnormalities are found by ophthalmoscopic examination of the fundus. These observations show that the disease is not related

to a persistence of the hyaloid artery or primary vitreous, as had been previously reported.

Development of the Disease

The first changes of the disease occur when the babies are approximately four weeks old. The earliest abnormalities are seen in the retina and retinal blood vessels. The retinal veins become greatly dilated and the retinal arteries unusually tortuous. This is followed by a localized or generalized swelling and infiltration of the retina, which often become so extensive that the course of the retinal vessels cannot be followed in the areas of greatest retinal edema. The vitreous usually becomes cloudy. Localized bands arise from areas of increased retinal inflammation and extend into the vitreous. This is followed by extensive retinal detachment and the formation of a complete retrolental membrane by the fusion of the vitreous bands and peripheral folds of detached retina. In these eyes all vision and usually light perception are soon lost. The complete retrolental membrane is usually formed by the time the baby is four months old.

Occasionally the disease becomes arrested at the stage in which only a partial membrane has formed behind the lens. In these eyes, bands resembling retinal folds extend through the vitreous to localized areas of retinal detachment. Partial vision is usually retained in these eyes and some infants with this less severe involvement of the retina retain enough sight to be able to walk about alone and play with toys when they grow older.

In premature infants, both eyes are usually affected by the disease, but often in varying degrees. The membrane may be complete in one eye and only partial in the other.

From these observations it is apparent that retrolental fibroplasia occurring in premature infants is not due to an arrest in growth or aberration of some embryonic or fetal structure. The retrolental membrane is formed by a transformation of the retina itself which occurs after birth. Operations to remove the retrolental membrane have been unsuccessful, for a portion of the retina itself is excised in the attempt to clear the retrolental space. No treatment has yet been found which is of any value when the disease is well established.

Metabolism—a Possible Factor

The cause of retrolental fibroplasia is still unknown. Our observations, which show that the disease occurs in the retina and begins in postnatal life, have redirected the thinking as to the possible etiological factors. Formerly, emphasis was placed on factors which might

have been effective in the prenatal life of the infant.[7] It is now evident that the most fruitful investigation is to be found in a study of the postnatal course of the infant. At the present time we are investigating alterations in the metabolism of the premature infant which might be related to the occurrence of retrolental fibroplasia.

The premature infant is physiologically immature and the close correlation between the incidence of retrolental fibroplasia and the birth weight of the infant adds support to the theory that a metabolic abnormality is the cause of the disease. Added support for this theory is given by the observation that the first changes observed in the disease occur when the baby is about one month old. At this time, the storage of essential metabolites may be depleted, and the infant, because of its physiological immaturity, may be unable to meet its nutritional requirements from the diet supplied.

The premature infant usually has difficulty in absorbing fat, so half-skim milk mixtures are frequently used for the feedings. Because of the low fat content of such a diet, possible deficiencies of the fat soluble vitamins A, D, K are usually prevented by adequate and often excessive supplements of these vitamins. Kinsey and Zacharias[2] found a correlation between the incidence of retrolental fibroplasia and the use of vitamin supplements in water-miscible form and the increased use of iron.

Of the fat soluble vitamins, vitamin E alone has usually not been added to the diets. Vitamin E, functioning as an anti-oxidant, plays an important role in protecting or stabilizing unsaturated fats, especially during their mobilization, metabolic turnover and storage in tissue cells.[8] In animal nutrition vitamin E is particularly important for the normal development of the immature organism.[9]

In our present investigations we are supplementing the diets of the smaller premature infants at the Johns Hopkins Hospital with a special water-miscible preparation of d-1 alpha tocopheryl acetate, a form of vitamin E. These supplements are started in the first week after birth. So far the results in the prophylaxis of retrolental fibroplasia with d-1 alpha tocopheryl acetate have been very encouraging. It seems hopeful that metabolic studies on the postnatal course of the premature infant will provide the solution to the etiology of retrolental fibroplasia.

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A Successful Vision Program for Small Companies

Robert J. O'Shea, *Director*

Industrial Vision Program, Maryland Society for the Prevention of Blindness

DESCRIBES how a local prevention of blindness agency mustered the social, medical and industrial forces of the community to make possible a vision program for small companies otherwise unable to provide such services.

A SPECIAL industrial committee was appointed by the Board of Directors of the Maryland Society for the Prevention of Blindness to investigate thoroughly the problem of sight conservation in various industrial plants throughout the state. Under the chairmanship of Joseph A. Haller, safety director of the State Accident Commission and vice-president of the Society, the Committee met throughout 1948. The need for attention to the eyesight of industrial workers in the Baltimore area was quickly apparent but the solution required the combined efforts of all interested groups. Representatives of management, organized labor, ophthalmology, optometry, safety, illumination and color engineers, and the optical companies were enlisted to study the problem and its solution.

The Committee found that the need for sight conservation was most prevalent among workers in the smaller industrial and business concerns. Many large companies both in Baltimore and throughout the nation had recognized and utilized the relatively new scientific management technique of organized industrial vision testing programs. This action seems to have been prompted initially, during the recent war, either by progressive management or on advice of the War Production Board and the National Society for the Prevention of Blindness. By their very size, the smaller concerns found it economically unsound to establish satisfactory programs within their

own plants. Should they and their employees be denied the benefits of this proved vision testing technique?

The Maryland Society decided that the answer to this community problem must be a decisive "no" in Baltimore. It was felt that the Society should operate an adequate and complete vision program for these smaller concerns.

Organization of Vision Program

In the fall of 1948, the writer was called upon to direct the task of organization, establishment, and introduction of the Industrial Vision Program of the Maryland Society for the Prevention of Blindness. The industrial vision service of a large optical company was leased, and arrangements were made for testing the visual skills of the employees.

It was realized that this ambitious service would be of an experimental nature. No other program was available to small plants on such a complete basis from a social agency. Fees were advisable so that management could provide some financial remuneration for the services received. Fees are based roughly on the number of employees, and range from $50 per year for plants with fewer than 25 workers to $500 per year for plants with the maximum of 400 employees. These service fees are approximately one sixth of the cost to a concern for establishment and operation of its own vision testing program. This advantage is possible because nearly all of the administration details of the Program are handled by the Society's office. Further financial subsidy was considered necessary during the initial years of this experimental service, and the farsighted Baltimore Community Chest underwrote the cost of this service for a period of three years.

In the organization process it was decided that nothing less than a complete vision program should be made available to smaller industrial plants. In addition to providing each employee with visual skills tests given at the plant by a Society staff member, studies of the seeing conditions are also made. The cooperation of the Safety Engineering Club of Baltimore and of the illumination engineers of the Baltimore Gas and Electric Company has been excellent. These groups provide surveys of the eye hazards and lighting conditions in the subscribing plants. Their recommendations are tailored to the requirements and financial limitations of the concern. They provide suggestions for improving the eye safety and illumination of the working place.

Procedures in Plants

The visual skills tests make it possible for the Society's consultant to compare the seeing ability of each employee with the minimum visual requirements found to be necessary for adequate performance on the job. These job vision standards are developed for each plant with the cooperation of the Occupational Research Center at Purdue University. Those workers who are found to have adequate vision for their jobs are so notified and advised to continue to take proper care of their eyesight. They are advised of some of the common signs of eye trouble and cautioned that although they possess the minimum vision requirements for their jobs this does not necessarily mean that their eyesight could not be improved.

Employees found to have defects are notified of their vision deficiency and advised to obtain a complete eye examination from a qualified eye doctor. The referral notice to workers who do not meet the visual requirements of their jobs includes a partial listing of interested ophthalmologists and optometrists in the Baltimore area. These eye doctors are approved by their professional associations and have indicated their desire to cooperate with the Society in handling referrals from the Industrial Vision Program.

This listing of eye doctors is illustrative of the close professional relations that have been carefully established and maintained by the Society. The 23 ophthalmologists and 24 optometrists included on the referral listing are supplemented by three eye clinics. The use of such a large panel was prompted by management's desire to encourage employees to obtain qualified professional care. Since the individual has complete freedom of choice, some still visit commercial establishments. However, the listing of professional practitioners has been a great help in encouraging those referred to avoid taking chances with their precious gift of sight.

Referral cards accompany the notice of visual deficiency to each employee. Prepared by the Society's office, these cards contain a duplication of the visual skills test scores and a brief description of the occupation and working environment of the individual. Clinical approximations of the test scores have been furnished to the eye doctors and the Society's office frequently provides more detailed information about the job if it is requested by the examining doctor. Actual visits to the plant or department are arranged by request to assist the professional men to better understand the seeing conditions and visual demands of the tasks.

Now that the first year of operation has been concluded the results of the Industrial Vision Program of the Maryland Society can be ob-

jectively viewed. The existing need for such vision testing in industrial concerns is clearly demonstrated by the large number of employees, who are found to have vision below the minimum job requirements. Over 40 per cent of the employees tested failed to meet their job visual standards. In various plants this percentage has ranged from a low of 39 to a high of 46.

Extent of Study

The service has been installed in five progressive companies in as many different types of industry. Ranging in size from 86 to 250 employees, these plants produce lithographed metal work, bank stationery, chemical products, sterling silver, and glass milk bottles. More than 1,000 industrial employees have thus been tested in the initial year of the Program, and the reactions of management and employees provide proof of the benefits of the service. All concerns that have installed this new service have been emphatic in their praise when contacted by companies considering application for the Program.

It is gratifying to note the prompt action of most employees after being notified of the advisability of obtaining visual care. Personal interviews are conducted at the work stations by the Society's representative two or three months after the referrals are made. This personal contact helps to encourage hesitant individuals to obtain the recommended professional care. When financial worries have caused this delay, clinic care is advised or arranged.

Need of Employee Education on Vision

The Industrial Vision Program of the Maryland Society has emphasized the appalling lack of vision consciousness among the wage earners. Since most of these employees are heads of families the importance of improving their vision consciousness is multiplied. To assist in this task various posters, films, and pamphlets are made available to the workers in addition to the personnel counseling done by the Society's consultant. Although all available eye health information is utilized, the Society has been forced to design special material for this education task. Blotters emphasizing good desk lighting for office personnel and special pamphlets for shop workers are samples of the means used to improve vision consciousness.

The problem of judging the effectiveness of the referral process is difficult because of the number of individuals who exercise their freedom of choice by visiting commercial optical establishments. The workers who leave the plant employment further complicate this

estimate since so many of the marginal workers have visual deficiencies. Considering these two chief factors it is nevertheless estimated that between 70 and 80 per cent of those referred have actually obtained visual attention.

Benefits of Professional Advice

No detailed tabulation of professional action has been attempted. Some visual deficiencies have been found to be uncorrectible. This is particularly true of monocular individuals or those with marked suppression in one eye. If this handicap might prove hazardous, either to himself or others, the employee is assigned to a job consistent with his visual capacities. Since the vision of most workers can be corrected to meet the requirements of their jobs in these industries, less than ten readjustments have been necessary. In general, referral has been very satisfactory, although not perfect. Previously unknown cases of eye pathology have been discovered by the examining eye doctor prior to refraction and referred for or given prompt ophthalmological care. In certain other cases the testing technician from the Society found individuals who had been neglecting ophthalmological care for known eye pathology. Counseling and clinic arrangements enabled these persons to continue needed medical care.

Value of Voluntary Agency

The favorable reception of the Industrial Vision Program by management and labor in Baltimore plants indicates that this method of sight conservation and improvement of vision consciousness is successful. It has been found to assist in solving the visual needs of the employees and owners of small companies. It is clear that only a social agency or a similar non-profit group can attempt this type of service for a series of small companies. The cooperation of professional, civic and municipal organizations, as well as the employees themselves, depends upon freedom from any hint of commercialism. There are indications that other eye health education agencies and non-profit associations will follow the Maryland Society's lead in this type of complete vision program for smaller concerns. The employee and employer in the smaller industrial organization are no longer handicapped by limited numbers of resources. The sight conservation possible from an organized industrial vision program is now available to these concerns in the Baltimore area. Other industrial states and communities may soon have similar service available.

Summary

The experimental Industrial Vision Program of the Maryland Society for the Prevention of Blindness has passed the trial stage and clearly demonstrates that a complete vision program for employees and management of small concerns is a practical and vital service to the community. Over a year old, the Program has shown that the benefits of vision testing can be made available to the employees and employers of the backbone of American industrial life—the company that employs less than 400 workers.

SIR STEWART DUKE-ELDER, M.D.: I, therefore, conceive primary simple glaucoma to be a condition characterized essentially by instability of vascular control and an impairment of the capillary endothelium and sclerosis, associated with instability of tension. If this is followed by sclerotic effects in the tissues affecting the whole eye, we get the typical picture of glaucoma simplex with raised tension; if it affects the posterior segment preferentially we get visual symptoms and excavation of the disc without tension; and if it affects the anterior segment, permanently raised tension is an early feature and the changes in the optic nerve are late. Reported in the *American Journal of Ophthalmology*, Vol. XXXIII, No. 1, January 1950, page 17.

The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request.

A Suggested School Vision Program*

Aims

1. To conserve the child's vision and to assist the child in obtaining and maintaining maximum visual efficiency.
2. To develop in the child of school age a sense of responsibility for taking care of his own vision.

How can we accomplish the objectives?

1. By providing good general health services including communicable disease control, safety and first aid, health appraisal and counseling, school sanitation, with special services for the exceptional child.
2. By providing a good visual environment including proper maintenance of adequate natural and artificial lighting; proper color, shade and type of finish on all reflective surfaces; proper type and arrangement of desks; approved chalkboards, and appropriate pedagogical practices.
3. By providing a good vision screening program including continuous teacher observation.
4. By providing adequate follow-up and use of community resources.
5. By providing special services for the child with visual problems.
6. By integrating teaching of eye health in the general educational program.
7. By providing pre-service and in-service education about eye health for all school personnel, including school administrators and custodians.
8. By developing an enlightened community consciousness.

Criteria for evaluating program

1. By reference to "Suggested School Health Policies" and "Health Appraisal of School Children," both available from American Medical Association; and to "The School Administrator, Physician and Nurse in the School Health Program," available from Metropolitan Life Insurance Co.
2. By reference to "American Standard Practice for School Lighting," available from Illuminating Engineering Society, 51 Madison Avenue, New York 10, N. Y.; and to checklist for school illumination and publications Nos. 456, 498 and D-111, all available from National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N. Y.

* Report of a committee on school vision program of the American Public Health Association School Health Section Round Table, "How to Judge the Effectiveness of a School Health Program," Dorothy B. Nyswander, Ph.D., Chairman, October 25, 1949, New York, N. Y.

3. For evaluation of a school vision screening program it is felt that better criteria will be available after the results of the St. Louis study are issued, in approximately one year. In the meantime it is believed that vision screening programs should be planned only in consultation with a local committee of ophthalmologists and optometrists, and should be evaluated in the light of follow-up which may show the extent of over- or under-referral.

4. Follow-up may be evaluated by:
   (a) Maintenance of records of the number of children needing eye care in comparison with the number actually having received it, since ideally 100 per cent of those needing eye care should have it.
   (b) By studying the number of children with eye defects such as loss of vision from strabismus, which may now be noncorrectable but which can usually be corrected if discovered and adequately cared for early in life.

5. To be evaluated with reference to "Education and Health of the Partially Seeing Child," by Winifred Hathaway, published by Columbia University Press, $2.50.

6. Teaching of eye health may be evaluated partially by study of school curricula to note extent to which material on eye health has been included or integrated with other subjects.

7. Preparation of school personnel may be evaluated in part by:
   (a) Analysis of yearly statistics on number of pupils with defects and on number of eye defects corrected to determine improvement.
   (b) Noting the rate of improvement in the visual environment.

8. Development of an enlightened community consciousness may be evaluated to a great extent by:
   (a) Discovering extent to which parents obtain eye examinations and correction for their children, instead of waiting for the public health nurse to round up the children and take them to a doctor.
   (b) Making comparative studies of the amount of tax money made available yearly for examination and follow-up of school children, since there is a direct relationship between the amount of money a community appropriates for these services and the degree of public understanding concerning health problems.

Respectfully submitted:

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Note and Comment

"Eyes to the Future!"—This is the title of the current Annual Report of the National Society for the Prevention of Blindness and it stands as a symbol of the expanding program to intensify the campaign against preventable blindness.

At the Annual Meeting last December there were two actions of unusual importance:

A 1950 budget goal of $500,000 was approved, substantially more than the $319,000 budget for 1949.

It was voted to increase the lay membership of the Board of Directors, and to increase the number of nonmedical persons serving on committees.

President Mason H. Bigelow emphasized that prevention of blindness is the concern of everybody—not just the doctor, the nurse, and the public health official.

Moving ahead to obtain greater participation on the part of the lay public, four new directors have now been added to the board—one is a lawyer, the other three are businessmen. Plans are under way for a stepped-up campaign of public education and to increase the Society's field work as a means of strengthening local prevention programs.

In planning future work, emphasis is being placed on the urgent need for vastly greater research on eye problems. A recent survey made by the Society disclosed that $365,000 a year is being spent on eye research by federal agencies, and another $550,000 by the nation's combined medical schools and research laboratories and institutes. This is a total of less than $1,000,000 a year for eye research.

These facts were reviewed at the last meeting of the Society's Research Committee, and plans were made for seeking additional funds for both clinical and basic laboratory research. Dr. William L. Benedict, Chairman of the Committee on Research, points out that "vast areas are still uncharted. For instance: glaucoma and cataract account for 23 per cent of all blindness. Yet the cause is unknown in 95 per cent of glaucoma cases, and in 70 out of 100 cataract cases." The Research Committee emphasized that $500,000 a year more is urgently needed for eye research alone.

In summarizing the objectives of our expanded program for prevention, Mr. Bigelow said: "The public must become as conscious of the

significance of eye health as it is of bodily and mental health—as alive to the threat of eye accident and eye disease as it is to the threat of other health hazards. Our goal is to work unceasingly for the day when substantially all preventable blindness will actually be prevented."

Society Elects New Board Members.—In recent weeks the following individuals have accepted membership on the Society's Board: D. Spencer Berger, Vice President and Treasurer, Berger Bros. Co., New Haven, Connecticut; Lawrence B. Elliman, Jr., Vice President, Pease & Elliman, Inc., New York, New York; Keith Lorenz, Chairman, New York State Labor Relations Board, New York, New York; and Carleton H. Palmer, Chairman of Board, E. R. Squibb & Sons, New York, New York.

Summer Courses for Sight-Saving Class Teachers.—The February issue of the *Journal of Exceptional Children* reports that the following colleges and universities will offer courses for the preparation of teachers and supervisors of the partially seeing:

Teachers College, Columbia University, New York City.
Illinois State Normal University, Normal, Illinois.
Michigan State Normal College, Ypsilanti, Michigan.
New Jersey State Teachers College, Newark, New Jersey.
San Francisco State College, San Francisco, California.
University of Tennessee, Knoxville, Tennessee.
Wayne University, Detroit, Michigan.

In addition to the foregoing, courses will be offered at Catholic University of America, Washington, D. C.; Tulane University, New Orleans, Louisiana; and probably at Florida State College, Tallahassee, Florida.

Aureomycin as a Prophylactic in Prevention of Blindness.—Discussing aureomycin as prophylaxis against ophthalmia neonatorum at the meeting of the East Central Section of the Association of Research in Ophthalmology, Samuel G. Clark, M.D., and Arthur M. Culler, M.D., made some valuable points. On the basis of a clinical and bacteriological study of 442 newborn given prophylaxis with 1 per cent silver nitrate and 1,000 infants given single instillations of 0.5 per cent solution of aureomycin borate, the authors considered purulent discharge from the eyes during the first two weeks of life in three groups.

1. Discharge and inflammation immediately after birth occur in 20 per cent of infants receiving silver prophylaxis. Half of these are contaminated, usually with staphylococci. This incidence may be

diminished by attention to three factors: (a) the use of a freshly prepared solution of 1 per cent silver nitrate would eliminate the free nitric acid which appears in time in the standard wax ampoules, (b) neutralization and removal of excess of silver can be accomplished by irrigation with normal saline solution immediately after instillation of the silver nitrate, (c) cleaning the lashes with sterile sponges moistened with 1:10,000 zephiran should be practiced if possible during the pause after the head is born or by the nurse while the cord is being tied, as there exists a possibility of mechanical removal of infected material before the conjunctival sac is exposed to infection when the child opens its eyes.

2. Actual infection of the eyes with virulent organisms occurs sporadically with either silver or aureomycin prophylaxis. These occurring in this series were controlled rapidly with aureomycin.

3. The eyes of infants appear to be particularly susceptible to infection. The readmission of infants at 14 to 21 days of age with profuse new purulent discharge means home infection. This is now the gravest danger to the eyes of the infant since a few days, delay in cure may mean corneal involvement. The use of aureomycin instead of boric acid for ocular hygiene during the first few weeks would seem to be a logical extension of prophylaxis more important than the actual antiseptic used at birth.

Wise Owl Club Statistics.—Analysis of the latest figures on the Wise Owl Clubs sponsored by the National Society for the Prevention of Blindness reveals that in one third of the cases the sight of both eyes was saved. The total number of eyes saved to date in the 797 cases recorded is 1,065. Saving in compensation costs is $2,662,000.

Eye-Bank Elects Officers.—The election of Samuel R. Milbank, Vice President of the Milbank Memorial Fund, as Chairman of the Advisory Council of The Eye-Bank for Sight Restoration, Inc., was announced by Mrs. Aida de Acosta Breckinridge, Executive Director of the Eye-Bank, at its national headquarters in New York City. Mr. Milbank succeeds his father, the late Albert G. Milbank. In addition, eight new members were named to the Advisory Council.

More than 1,700 eyes have been received by the Eye-Bank since its formation in 1945. Nearly 4,000 individuals have received eye examinations at the Corneal Clinic of the Manhattan Eye, Ear and Throat Hospital since the clinic was established by the Eye-Bank two years ago, Mrs. Breckinridge also reported.

Medical Science Triumphs Over Vivisectionists.—From a recent issue of the *Membership News* of the Maryland Society of Prevention of Blindness, we learned that Mr. John W. Avirett, 2nd, past President of the Maryland Society and a present Board Member of the National Society, acted as attorney for Baltimore's physicians in the recent "battle of the dogs." It was a battle between the medical scientists and the anti-vivisectionists as to whether the stray dogs in the city pound should be turned over to the local medical schools for research work. Although many nationally recognized persons who are anti-vivisectionists attended the public hearing to lend weight to their cause, medical science triumphed and humanity will be benefited.

Eye Health in the College Curriculum.—Marjorie A. C. Young, the National Society's consultant in education, is making a study of the extent of teacher preparation in eye health, facilities in colleges for actual classroom experience in relation to eye problems, and what colleges are doing about the eye health of their students who are the teachers of the future. Thus far, 16 of the 40 colleges scheduled to be analyzed have been surveyed. They are located in the following states and the District of Columbia: Connecticut, Maryland, Missouri, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Tennessee, and West Virginia.

National Health Council.—William W. Wood of Boston, Massachusetts, has joined the staff of the National Health Council as field representative. Mr. Wood's assignment will be concerned with the Council's program of promotion of full-time local health departments and development of greater support for those already established.

Accredited Colleges of Optometry.—Pacific University now has one of the nine accredited colleges of optometry in the United States. The accrediting agency, American Optometric Association, which recently sent a committee of its Council on Education to inspect Pacific, last week gave its full stamp of approval to the optometric unit. Besides Pacific, accredited optometry schools are at Columbia University, Ohio State University, Pennsylvania State College of Optometry, University of California at Berkeley, the Los Angeles School of Optometry, Massachusetts School of Optometry at Boston, Chicago College of Optometry, and the Southern College of Optometry at Memphis, Tennessee.

Mobile Eye Health Service.—The New Jersey Commission for the Blind reports that about 7,000 children have been served by the

Mobile Eye Health Service in public, parochial and state schools in nine New Jersey counties. Of 5,036 public and parochial school children examined so far, 1,350 were referred to ophthalmologists and family physicians, 856 have had glasses prescribed by the clinic's ophthalmologist and 149 have been recommended for surgery. Ophthalmologists have expressed the belief that the diagnostic work of this unit has resulted in referrals of patients they would not otherwise have seen.

Cataract Pamphlet Released.—A 4-page pamphlet, "On Being a Cataract Patient," has been reprinted from the September issue of *The Seer*, the quarterly publication of the Pennsylvania Association for the Blind. Betsy M. Shank, prevention consultant for the Association, will be happy to send a copy of this pamphlet to any interested agency. Requests should be addressed to the Association, 1607 N. Second Street, Harrisburg, Pennsylvania.

Lewis H. Carris, LL.D.—1869-1950.—As we go to press, we learn with sorrow of the death of Dr. Lewis H. Carris, the Society's Director Emeritus. Dr. Carris was Managing Director of the Society from 1922 to 1938, a period in which the Society's expansion reflected Dr. Carris' foresight and progressiveness. As Managing Director of the Society, he assisted the League of Red Cross Societies, in 1928, in making a study of the leading world-wide causes of blindness. Following publication of the report on this study, the International Association for Prevention of Blindness was organized at The Hague in September 1929, and Dr. Carris took a leading part in the formation of this Association.

He was recipient of the 1942 Leslie Dana medal, awarded annually to an individual who has made an outstanding contribution to public welfare in the field of sight conservation. Dr. Carris was also closely identified with the work of various other public health and social welfare organizations. He was formerly Vice-Chairman of the New York State Commission for the Blind and was formerly Vice-President of the National Health Council.

Current Articles of Interest

Acute Eye Disorders as Seen in General Practice, A. Penn Crain, Jr., M.D., *New Orleans Medical and Surgical Journal*, August, 1949, Vol. 102, No. 2, pp. 78–81.

The author calls attention to some of the acute eye disorders which the general practitioner may be called upon to treat. These include the various forms of conjunctivitis, uveitis and glaucoma.

The Importance of Ophthalmology in Internal Medicine, John C. Jones, M.D., *Journal of the National Medical Association*, November, 1949, Vol. 41, No. 6, pp. 256–258.

The author believes that every practicing physician should be familiar with the relationship of the eye to the rest of the body, and with the use of the ophthalmoscope. Not only does the eye have its own particular diseases, but it also reveals diseases of various other organs of the body before any symptoms are noticed by the patient. The ophthalmoscope enables the physician to determine whether the eye is normal or pathologic; and, although he need not recognize the specific disease, he can determine the patient's need for treatment and refer him to the ophthalmologist. Among the diseases of the body which may be recognized initially by ocular changes are: leukemia, diabetes, cardiovascular diseases, blood dyscrasias, deficiency diseases and pre-eclamptic signs in pregnant women. Dr. Jones describes in detail the eye examination as it can and should be done by the internist or general practitioner.

Hereditary Myopia, Karl C. Wold, M.D., *Archives of Ophthalmology*, September, 1949, Vol. 42, No. 3, pp. 225–237.

In his analysis of myopia and its hereditary aspects, Dr. Wold concludes that there are two types of myopia: (1) hereditary, which may be dominant, recessive or sex linked, and (2) acquired, due to disease or trauma. Dominant myopia is the most prevalent type, followed closely in frequency by the recessive type, the sex-linked recessive form being the least common.

Myopia was found in 2.7 per cent of newborn infants under 7 days of age and in 6.5 per cent of all children up to 6 years of age.

In a survey of 257 kindred with myopia, the following data were obtained: (1) with neither parent myopic, 230 of 645 children, or 35 per cent, were myopic (the myopia was purely recessive); and (2) with one or both parents myopic, 309 of 628 children, or 49 per cent, were myopic (in these children the trait was dominant).

Routine Refraction for Deaf Patients, G. Allan Jakeman, F.B.O.A., D.Orth., *The Optician* (London), Friday, September 9, 1949, Vol. CXVIII, No. 3049, pp. 169–171.

For the routine refraction for deaf patients, the author suggests a method consisting of written interrogation in the form of permanent cards printed in bold capitals by the refractionist to meet his own needs. He lists his own group of 18 cards and describes their use in the following tests: preliminary investigation; ophthalmoscopy; estimation of refractive error; static retinoscopy; subjective check; and muscle balance and near point tests. The use of such cards makes a simple routine possible by eliminating every unnecessary step, and by putting emphasis on objective methods.

Optic Neuritis from Cold Permanent Wave, John T. Robson, M.D., and Walter Cameron, M.D., *Northwest Medicine*, October, 1949, Vol. 48, No. 10, pp. 701–702.

The authors provide the following comment on two cases which they believe to be the first of their kind to appear in the literature:

"Two cases of optic neuritis have been presented occurring in mother and daughter. They live apart and the only possible toxic agents common to both are cosmetics.

"Toni home cold wave preparations were used by both and the time intervals were such as to link this preparation with the optic neuritis in each case.

"It seems to me and others that the attitude of the Pure Food and Drug Administration has been quite lax in a matter which could and should be regulated. Mother and daughter have received financial compensation without court procedure."

Trachoma in Missouri, Arthur A. Siniscal, M.D., *Archives of Ophthalmology*, October, 1949, Vol. 42, No. 4, pp. 422–437.

Although the incidence of trachoma in Missouri is declining, it remains one of the principal causes of blindness in that state. Until recently, this disease was the cause of blindness in 16 per cent of the total known cases of blindness in Missouri. The decline in incidence is largely due to the effectiveness of the trachoma control

program carried out by the Missouri Trachoma Hospital. Figures taken from a report of the Missouri Commission for the Blind attest to the program's effectiveness. Prior to 1926, this disease accounted for 25.5 per cent of the cases of total blindness; from 1926 to 1935, for only 14.4 per cent; and from 1935 to 1944, for only 12.3 per cent. In his discussion of treatment, the author cites the highly successful use of a new sulfonamide drug (NU–445), licensed only for experimental use at the time of his writing. The drug is a highly soluble sulfonamide compound, relatively free of toxic side effects and is given in 0.5 gm. tablets by mouth and in 10 per cent aqueous solution for local instillation. Eventual eradication of trachoma will depend upon early detection and treatment, ophthalmologic examination of associates of infected persons and good ocular hygiene. In Dr. Siniscal's words, "Prevention through public health education is even more important than cure."

Prophylaxis of Gonorrheal Ophthalmia of the Newborn, Comparison of Effectiveness of Penicillin and Silver Nitrate, James H. Allen, M.D., and Luciano E. Barrere, M.D., *The Journal of the American Medical Association*, October 22, 1949, Vol. 141, No. 8, pp. 522–526.

The authors arrive at the following conclusions:

"1. The diminishing incidence of Neisseria gonorrheae in cultures from the antepartum cervix points toward the possibility of completely eliminating this type of infection.

"2. Complete elimination of gonorrheal infection is the best solution for the prevention of acute gonorrheal conjunctivitis of the newborn and would eliminate the necessity of prophylactic procedures.

"3. Until the infection is completely eliminated, careful routine prophylaxis should be employed.

"4. Exposure of the conjunctiva to 1 per cent or 2 per cent solution of silver nitrate for a time adequate for the prevention of gonorrheal conjunctivitis results in chemical irritation without sequelae.

"5. The occurrence of exogenous conjunctivitis of the newborn is not affected by procedures designed for the prevention of infections caused by birth canal contamination of the conjunctiva.

"6. The incidence of nasolacrimal obstruction in the newborn was not significantly different after silver nitrate prophylaxis than after penicillin.

"7. The occurrence of inclusion blennorrhea in the newborn was not affected by either silver nitrate or penicillin prophylaxis.

"8. From the data in this study, penicillin has no advantage over silver nitrate in the prophylaxis of gonorrheal conjunctivitis of the newborn. However, because of the low incidence of gonorrheal infection in this material an adequate comparison was not possible.

"9. Therefore, similarly controlled studies should be made in a population with a higher incidence of gonorrheal infections.

"10. Until adequate bacteriologic controlled trial of penicillin has been made, the safest procedure for routine use is careful application of 1 per cent silver nitrate solution to the conjunctiva immediately after delivery and again after the infant has been bathed."

Optimal Methods in the Treatment of Ophthalmia Neonatorum, Arnold Sorsby, M.D., F.R.C.S., and Iris Kane, M.B., B.Chir., *British Medical Journal*, Sept. 10, 1949, No. 4627, pp. 562–565.

Summarizing their findings in a series of 151 cases of ophthalmia neonatorum treated by different methods, the authors indicate (1) that the oral administration of doses of 200,000 units of penicillin, either exclusively or after an initial intramuscular injection, has proved disappointing; (2) that combined oral sulphonamide and local penicillin therapy proved effective in reducing the duration of treatment but ineffective in reducing the considerable frequency of relapses seen with either sulphonamide or penicillin therapy; (3) that length of treatment was likewise reduced by increasing the dose of sulphonamide; but that the use of these larger doses of sulphonamide does not apparently influence the relapse rate.

"For the present," the authors conclude, "the best way of administering penicillin is still the instillation of drops of 10,000 units per ml. initially at intervals of a minute for half an hour and subsequently at less frequent intervals. For the best results with sulphonamide therapy higher doses than those used previously are necessary."

An Investigation into the Mode of Heredity of Congenital and Juvenile Cataracts, Johan Saeb, M.D., *The British Journal of Ophthalmology*, October, 1949, Vol. XXXIII, No. 10, pp. 601–628.

The author presents case histories of 20 congenital and 7 juvenile cataracts occurring within 17 families, in which there was no known case of rubella during pregnancy. In 9 of the 17 families, the parents of the affected individuals were related; and in 5 of

these the parents were first cousins. In each of 8 of the families, 2 or more persons were affected. Previous results of investigations into this field showed that dominant inheritance appeared to be the most frequent, with relatively rare examples of recessive inheritance. This author believes, however, that even though the material of his study is too small to give statistical proof, it nevertheless seems to indicate recessive inheritance. As a eugenic measure, he believes that the members of these families must be warned against intermarriage, but, as dominant types also occur, he emphasizes that the mode of inheritance must be studied in each case.

A Study in Visual Defects in Young Children, P. A. Tyser, M.D., B.S., D.P.H., and T. W. Letchworth, M.D., F.R.C.S., *British Medical Journal,* November 5, 1949, No. 4635, pp. 1022–1023.

Retinoscopy was performed with a plane mirror without using a mydriatic in an endeavor to establish a simple method whereby gross errors of refraction could be ascertained in children under 5 years. Results of 460 examinations of nursery school children, 247 boys and 213 girls, showed 19 visual defects in each group or 7.7 per cent and 8.9 per cent respectively, with an over-all percentage of 8.26. Eleven or 2.39 per cent were already receiving treatment. A further group of 33 cases were revealed of which 27 or 5.87 per cent were later confirmed. The authors wish these results to be regarded as a pilot survey, indicating that nursery school children may not be representative of the whole child population in this age group, and that retinoscopy without using a mydriatic cannot give entirely accurate information about the ocular mechanism. However, they demonstrate that this method is accurate enough to be used on a wide scale, that a large number of children in the age group studied do have gross errors of refraction, and that it is important to detect and treat these as early as possible.

The Psychology of the Poor Reader, William H. Crisp, M.D., *Rocky Mountain Medical Journal,* October, 1949, Vol. 46, No. 10, pp. 833–836.

The following conclusions are of interest: first, refractive errors play a small part in the problem of the poor reader, but should be considered as one basis for early childhood inhibitions; second, learning to read well is the most important aim of the first two or three years of school, and failure then can affect adversely the entire life of the individual; third, it is essential to spot the poor reader within the first year or so, and to take corrective steps with emphasis first on

ability to recognize letters and their phonetic values, and later syllable and word structure; and fourth, an important mistake has probably been made in departing from the old mechanical methods of teaching word structure and recognition. The practical approach to acquiring reading skill consists of not only correcting failures but also using a method which will avoid creating and fixing reading failures in new generations.

Eye Headache and Discomfort Not Corrected by Glasses, W. N. Moray Girling, M.D., *Northwest Medicine*, February, 1950, Vol. 49, No. 2, pp. 110–111.

Discrepancies in ocular muscle balance, in the experience of this author, produce eye symptoms which are not relieved by glasses. While the extraocular musculature is concerned with binocular focusing, the ciliary muscle within the eye permits accommodation to be effected. This is the link between muscle action and the refraction of the eye which is still a research problem. In ophthalmology increasing attention is being given to the motor system of the eyes, their efficient coordination and balanced binocular vision. Orthoptic training has been put on a definite basis, ophthalmologists directing visual training. Dr. Girling provides 5 case histories in which it appears that the progress of increasing myopia may be stopped by proper orthoptic treatment. He concludes with the comment that ophthalmologists should constantly be alert for evidence of muscle imbalance and deficiency of accommodation so that patients may have the benefit of what little knowledge exists on this complex subject of ciliary spasm.

Report on Ophthalmological Survey: Schilpadfontein (Warmbaths) Nylstroom Native Areas, S. K. Wentworth, July, 1949, Bureau for the Prevention of Blindness, South African National Council for the Blind.

Cogent statistics from this report show 200 cases of trachoma out of 1,190 persons examined. In the age group 41 to 60, a total of 181 persons were afflicted with eye diseases; 20 had cataract; 13 had cataract and complications; and 2 had glaucoma. In the age group 61 and upward, a total of 214 suffered from eye disease; 44 had cataract; 32 had cataract and complications; and 2 had glaucoma.

Some War Time Statistics, G. C. Dansey-Browning, M.D., *The British Journal of Ophthalmology*, November, 1949, Vol. XXXIII, No. 11, pp. 670–677.

The author reviews some statistics from the Statistical Report on the Health of the Army from 1943 to 1945. In the United Kingdom

in 1943, cases of eye disease comprised about 2 per cent of the population of military hospitals. The percentage of eye diseases among all hospitalized persons was 1.4 for all male other ranks, and 0.8 for members of the army women's services. In the Middle East, of all lesions among the other rank hospital population, conjunctivitis accounted for 0.74 per cent in 1943 and 0.73 per cent in 1944. Keratitis accounted for 0.50 per cent of all lesions in 1943 and 0.49 per cent in 1944. As for Far Eastern prisoners of war, the report gave about 5½ per cent as having incurred optic neuritis and a further 2 per cent as showing defects of the field of vision. When secondary disabilities were included, the percentage of those discharged with either optic neuritis or defects of the field of vision rose to 11 per cent of the total. At the time of army discharge, 25 per cent of the men still showed effects of nutritional deficiency. The author provides the following table, which gives an excellent comparison of the discharge rates for primary disabilities of the eyes:

Diagnosis	*Non-Prisoners*	*P.s/W. Europe*	*P.s/W. Far East*
Defects of the Field of Vision.....	0.3 per cent	0.2 per cent	2.0 per cent
Optic Neuritis.....	0.1 per cent	0.1 per cent	5.6 per cent

Mention is made of some American statistics published in 1944, which show that 5.5 per cent of the enlisted men had vision in one eye of 6/18 or less; and a British survey in 1946–1947, showing that 8.8 per cent of their recruit intake had vision of 6/18 or less in one eye. A recent examination of British recruits for communication troops revealed that, of about 8,000 men, some 15 per cent were found to need glasses.

Ocular Injuries in the Armed Forces, Colonel William Stone, *The Journal of the American Medical Association*, January 21, 1950, Vol. 142, No. 3, pp. 151–152.

Approximately 80 per cent of the cases of blindness in World War II could be directly attributed to trauma. World War I ocular traumatisms in Army personnel in combat amounted to 2.14 percent of all battle injuries, while only 0.5 per cent of these injuries occurred in noncombatant Army personnel. Although incomplete, World War II data show eye injuries involved in about 2 per cent of combatant and noncombatant injuries. These resulted in at least 14,900 cases of impaired vision or blindness in one or both eyes, and by the end of 1945, 5,014 enucleated eyes. By tentative comparison it appears that noncombat eye injuries increased about fourfold while combat injuries remained about the same. That many injuries could be prevented by

adequate attention and safety precautions was clearly demonstrated in one theater of operations where war accidents were reduced by these measures alone from a rate of 120 per 1,000 per annum to 40 per 1,000 per annum. Many traumatisms were complicated by inadequate treatment at the time of injury, which prompts the author's recommendation that all medical practitioners should know the fundamentals of treatment of ocular traumatisms and, when necessary, refer patients to eye specialists for definitive treatment.

With an Eye to Safety, Rowland V. Merrifield, Assistant Secretary, Air Reduction Sales Company, *Occupational Hazards*, October, 1949, Vol. 11, No. 12, p. 29.

The need for this plant's eye safety program has been amply demonstrated by the finding that 70 per cent of all employees examined required visual correction. Three years of planned eye safety has resulted in a 5 per cent jump in production, reduced frequency and seriousness of eye accidents, improved employee-management relations, higher employee morale, and a decline in rejected parts. Every new employee is given an eye examination by the plant ophthalmologist and referred to the optician who orders the proper safety spectacles. Periodic re-examination of the eyes is done every 18 months for employees under 40 years of age and for those 40 years or over, every other year. Young workers who have myopia are examined every six months. The author states that industry has about 300,000 eye injuries per year at a cost of over one hundred million dollars annually, that 80,000 persons have lost the sight of one eye as a result of occupational injury, and that another 8,000 are totally blind for the same reason. In view of these facts the importance of an adequate plant eye safety and health program cannot be overestimated.

Further Investigations on the Action of Detergents on the Eye, M. Ginsburg, M.D., and J. N. Robson, M.D., *The British Journal of Ophthalmology*, Sept., 1949, Vol. XXXIII, No. 9, pp. 574–579.

The results of 36 experiments on the effect of five detergents on the penetration of sodium sulphacetamide into the eye showed sodium dodecyl sulphate to be the most effective. Four tables are included which illustrate the following: the effect of different concentrations of wetting agents on the penetration of 10 per cent sodium sulphacetamide into and through the cornea; the penetration of sodium sulphacetamide with aerosol OT into the eyes of living and dead rabbits; the effect of age of solution on the action

on the isolated cornea of lissapol N. and dodecyl sodium sulphate; and the effect of wetting agents on the interfacial tension at a water/paraffin interface and the percentage increase in the absorption by the cornea of 10 per cent sodium sulphacetamide.

Lesions of the Eye from Radiant Energy, David G. Cogan, M.D., *The Journal of the American Medical Association*, January 21, 1950, Vol. 142, No. 3, pp. 145–151.

Dr. Cogan discusses types of radiation (spectrum), transmission, and absorption in the ocular media, and harmful effects of radiant energy on the eye. Lesions in the eye are considered first as they affect the eye as a whole, then as they affect the cornea, lens and retina. Particularly interesting is the author's discussion of cataracts from gamma rays and neutrons which are similar to those produced by roentgen rays. He points out that there is reason to believe that the cumulative effect of small doses is greater with these hard rays than with roentgen rays, and there is therefore a greater danger from chronic exposures. This has been brought to the fore in the past few years with the occurrence of cataracts in cyclotron workers and with the suggestive evidence that in some of the workers exposed to the atomic bomb lens changes developed. So far conclusive evidence is not available to show that the lens changes resulted from radiation or that there was enough gamma or neutron radiation reaching the individual to produce cataracts. Dr. Cogan concludes his paper with a brief discussion of protection of the eyes and treatment of ocular lesions.

Chemical Burns of the Eye, W. Morton Grant, M.D., *The Journal of the American Medical Association*, January 21, 1950, Vol. 142, No. 3, pp. 152–158.

This discussion of chemical eye burns includes the following topics: factors determining the nature of action of chemicals on the eye (amount and duration of exposure, chemical reactivity of the injurious agent and physicochemical properties of the injurious agent); tissue responses to injurious chemicals; and treatment. Regarding treatment, he points out that ordinary tap water is more effective in removing noxious chemicals from the eye than any attempt to neutralize the chemical itself.

Pathologic Physiology of Truck and Car Driving, Captain Harold D. Clayberg, Medical Res., U.S. Army, *The Military Surgeon*, October, 1949, Vol. 105, No. 4, pp. 299–311.

While this paper deals with the whole problem of man's adaptation to our motor age and its ever-increasing rapid transit, a considerable

portion is devoted to the exacting demands upon the eyes. The author discusses fatigue, acuity of vision, lateral images, craniocervical myotension, and glare. Fatigue added to the complex process of driving produces nervous tension and retarded responsivity, so that greater effort is required to focus the eyes on the road and to remain alert to conditions on both sides of the road. The lateral sequence of scenery rushing past on each side is monocular, and in two opposing patterns which conflict in consciousness. In addition there is the visual picture of the road ahead which is binocular, and on which major attention centers. This creates a conflict which causes tension and confusion in the tiring driver. Since the mental and psychic equipment of man is not far removed from that of primitive man, fear is prominent in the tension setup. When the higher brain centers become fatigued, they partially relax control over the lower centers, as yet only partially conditioned to driving speeds by about two generations, and the paralyzing hand of fear can then be laid upon the man at the wheel. The eyes are the most important of the special sense organs. When the eyes become fatigued and the emotion of fear enters, driving ability is impaired and accidents frequently result. It is therefore important that the eyes of drivers have normal visual acuity and binocular vision.

Blood Groups and Effects of Roentgen Irradiation in Retrolental Fibroplasia, Thomas O. Paul, M.D. *Archives of Ophthalmology,* June, 1949, Vol. 41, No. 6, pp. 659–666.

"The treatment of retrolental fibroplasia with roentgen radiation produced little change in the vascularity of the membrane. A study of the possibility that a blood factor is a cause of prematurity in this congenital malformation led to no definite conclusion. Further studies of this type at several medical centers, with possibly a central registry, might bring useful information to light."

Retrolental Fibroplasia, Algernon B. Reese, M.D., and Frederick C. Blodi, M.D., *Ophthalmologia Ibero Americana,* Vol. XI, No. 1, 1949, pp. 18–23.

According to these authors, retrolental fibroplasia has become the commonest cause of blindness in preschool children. Rare until the last 10 or 15 years, the disease is now estimated to be the cause of one third of all preschool blindness in the United States. This eye disease, occurring in premature infants, is characterized by an opaque, vascularized membrane located behind the lens. Figures

quoted from "The Blind Preschool Child," New York, 1947, indicate that among known causes, retrolental fibroplasia was the cause of blindness in 42 per cent of the blind preschool children in Illinois, 30 per cent in New Jersey, 22 per cent in New York, and 56 per cent in Massachusetts. At the Institute of Ophthalmology in New York where the authors have observed 162 cases, 92 per cent were premature infants born in 1945 or later. The increased incidence is believed to be, in part or wholly, due to the fact that the mortality of premature infants has been much lower in the last decade. This paper includes a discussion of pathology, clinical manifestations, etiology and treatment of retrolental fibroplasia. Concerning treatment, the authors indicate that surgical efforts have been discouraging; and that the emphasis in research should be on finding the cause of the disease in the hope that this knowledge will make prevention possible.

Retrolental Fibroplasia, Arthur H. Downing, M.D., *The Journal of the Iowa State Medical Society,* February, 1950, Vol. XL, No. 2, pp. 60–65.

"Seven cases of retrolental fibroplasia seen in private practice are presented. The birth weights in all these children with the exception of the last were less than 4 pounds. The largest weighed 4 pounds, and the smallest weighed 2 pounds, 1 ounce. They were all born 2 to 3 months prematurely. The largest baby was born 7 weeks prematurely and the smallest 3 months prematurely. Of these cases 2 were bilateral and 5 unilateral. All of these cases were first seen before the age of 6 months except the first one. Associated general abnormalities were present in only one case, the seventh . . . which had an associated abortive hydrocephalus. An unusual finding was that the 5 unilateral cases showed marked high myopia in the fellow eye.

"Retrolental fibroplasia is a problem of social importance. There are perhaps 600 new cases a year in this country, thus adding much to the blind load and presenting difficult educational and other problems. The disease process which occurs in this condition is now fairly well understood, that of an engorgement of the vessels, swelling and detachment of the retina and the formation of a retrolental membrane which consists of fused retina and retinal blood vessels. The cause is completely unknown; whether something new in treatment of prematures is the cause, or whether it is that many more premature babies are now saved than used to be is a question. The cause of the condition awaits further investigation."

Use of Hyaluronidase in Ophthalmology, S. N. Key, Jr., M.D., and Sam N. Key, M.D., *Texas State Journal of Medicine,* January, 1950, Vol. 46, No. 1, pp. 31–33.

The authors describe their experience with the use of hyaluronidase, an enzyme, and arrive at the following conclusions:

"We are hopeful of directing attention to hyaluronidase, which we believe has been a useful supplement to our anesthetic techniques; it appears to have harmlessly improved the quality and ease of the common infiltration and nerve block methods about the eye. If the slight experience referred to here is sustained by us and others, we believe that the use of hyaluronidase will be worth while. Finally, we wonder if it will be found to have additional uses in ophthalmology."

The Effect of Hyaluronidase Injection on the Vitreous Humor of the Rabbit, A. Pirie, M.D., *The British Journal of Ophthalmology,* November, 1949, Vol. XXXIII, No. 11, pp. 678–684.

Experiments to see whether disaggregation of hyaluronic acid from a viscous to a nonviscous form in the vitreous humor is a permanent change and whether any visible change persists as a result of hyaluronidase (an organic compound) action led to the following results:

"1. The hyaluronic acid in the vitreous humor is disaggregated by hyaluronidase injection and remains so for at least a month. After this time aggregated hyaluronic acid is found, showing that hyaluronic acid can be produced in or secreted into the vitreous humor during life.

"2. Injection of rabbit testis hyaluronidase preparations into the vitreous humor of the rabbit caused a prolonged inflammatory reaction, noticeable within two hours in the vitreous humor.

"3. The nitrogen contents of both vitreous and aqueous humors are increased after hyaluronidase injection."

Onchocerciasis in America, L. Pellman Glover, M.D., *The Pennsylvania Medical Journal,* September, 1949, Vol. 52, No. 12, pp. 1371–1374.

Onchocerciasis is a parasitic disease in man, transmitted by the bite of a black fly, Simulium. Infestation with the filarial worm (onchocerca volvulus) occurs, producing tumors of the skin, papular dermatitis and ocular complications. Ocular lesions are produced by the microfilariae and their toxins which penetrate into all parts of the eye, causing irritation and photophobia. Gradually the pupil becomes occluded and the cornea obscured. In cases where there are gross choroidal changes, optic atrophy occurs. Many victims of onchocerciasis become totally blind. The disease is

endemic in a small area of the Western Hemisphere, but widespread in Africa. Dr. Glover's paper includes a discussion of diagnosis, treatment, prognosis and possible extension of endemic areas. Commenting that many writers fear the extension of this disease into the United States, Dr. Glover cites one who believes that the new Pan-American Highway has created a medical entomologic problem.

Treatment of Congenital Glaucoma with Beta Radiation, Report of a Case, George M. Haik, M.D., Louis A. Breffeilh, M.D., and J. E. Boggess, M.D., *New Orleans Medical and Surgical Journal*, October, 1949, Vol. 102, No. 4, pp. 182–185.

Report of a case of congenital glaucoma in a five-year-old boy is presented. The authors applied beta radiation over the ciliary body at 9 o'clock and at 3 o'clock for ten-minute periods, using the Iliff applicator which contains 50 milligrams of radium screened by 1/10 mm. of monel metal. A total dosage of fifty minutes at 9 o'clock and thirty minutes at 3 o'clock was used. Experimental evidence in rabbits had indicated that the destruction of the ciliary body was sufficient to control the formation of aqueous. Beta radiation was used only after other attempts at treatment had failed. All other medication was discontinued after beta radiation and the tension remained fairly stable. The authors state that all indications point to improvement in an otherwise hopeless case.

The Treatment of Glaucoma, Francis H. Adler, M.D., *Post-Graduate Medicine*, February, 1950, Vol. 7, p. 95.

The author believes the treatment of glaucoma has been materially advanced by the concept of narrow angle and open angle types, through the use of the gonioscope. He feels that it should be a routine procedure in every ophthalmologist's office to measure the pressure on every patient past 45 years of age with the Schiötz standardized tonometer. In this way, the disease would be picked up before the stage of cupping and field loss, which generally have been the criteria for diagnosis. The general physician should be acquainted with the fact that the diagnosis of glaucoma in the early stages can only be made by an experienced ophthalmologist. The general practitioner should be reminded that in the early stages of open angle glaucoma before field loss sets in, there are no characteristic signs or symptoms, and he should be urged to refer patients to an ophthalmologist for routine examination of intraocular pressure. The author feels that much more fundamental research is needed in order to improve the

outlook in glaucoma. Also, to evaluate treatment, carefully kept statistics should be compiled over long periods of time by the various glaucoma clinics now in operation.

A Therapeutic Step in Acute Glaucoma, G. de L. Fenwick, M.D., *The British Journal of Ophthalmology,* November, 1949, Vol. XXXIII, No. 11, pp. 688–693.

The author reports three cases of acute glaucoma, terminated by a retrobulbar injection of novocain and suggests that this be tried in all cases of acute glaucoma which are not improving after 24 hours of the usual intensive treatment—miotics, counterirritants and sedatives. Orbital hemorrhage is the chief danger; but this can be avoided by using a special needle. Although it is not known how retrobulbar novocain relieves acute glaucoma, the author indicates that its effect could be due to the following: extra-ocular muscle paralysis; inhibition of parasympathetic activity; inhibition of sympathetic activity; or interruption of reflexes.

Antihistamines in Ophthalmology, Lewis Nemeth, M.D., *The British Journal of Ophthalmology,* November, 1949, Vol. XXXIII, No. 11, pp. 665–669.

Antistin, a synthetic antihistamine, yielded good results in the edema of Quincke, acute and subacute conjunctivitis associated with allergic dermatitis, eczema, allergic conjunctivitis, hay fever, spring catarrh and superficial keratitis. The drug given orally checked the hypersensitivity reactions caused by penicillin. Antistin was applied locally in all these conditions, but in the treatment of episcleritis and uveitis of focal origin it often proved beneficial given by mouth. The author believes that in view of the good results obtained, these antihistamines can be recommended for trial by ophthalmologists.

Corneal Transplantations, Indications and Contraindications, Frederick C. Stansbury, M.D., *Archives of Ophthalmology,* February, 1950, Vol. 43, No. 2, pp. 337–364.

Results on a series of 165 corneal transplantations having been previously reported, the purpose of this paper is to evaluate the preoperative findings in the same series in view of postoperative visual results. Dr. Stansbury surveys the literature concerning indications and contraindications for corneal transplantation and lists the favorable and unfavorable conditions for this operation. Having excluded 9 operations, he divides the remaining 156 into two groups: 122 primary and 34 secondary corneal transplantations. Preoperative findings in the former are summarized as follows:

"Judged on the basis of diagnosis, visual results were best in keratoconus and poorest in chemical burns of the cornea. The results in eyes with interstitial keratitis were not significantly better than the average results for the series; this observation is not at all in accord with the reported results of the operation in this disease.

"It appears significant that none of the operations performed on eyes with a degenerative process of the cornea was successful.

"The visual results improved in inverse proportion to the size of the corneal opacity. . . .

"The visual result also improved in inverse proportion to the amount of corneal vascularization. . . .

"None of the eyes with anterior synechiae or glaucoma achieved improvement in visual acuity after operation. . . .

"No correlation between the recorded preoperative prognosis and the postoperative visual result could be determined."

The preoperative findings in the secondary corneal transplantations indicated:

"Visual results again improved in inverse proportion to the extent of corneal opacification and/or vascularization.

"Preoperative complications were common in this group of cases of secondary transplantations. Glaucoma and anterior synechiae were most frequent. None of these eyes with additional complications achieved a successful result. . . ."

A Contribution to the Treatment of Corneal Ulcers, Particularly of Serpiginous Ulcer, Albert Stein, M.D., *Archives D'Ophtalmologie*, December, 1949, Vol. 9, No. 6, pp. 722–731.

Combining prolonged penicillin baths of the eye with penicillin iontophoresis was efficacious in stopping progress of ulceration and in bringing good visual recovery. The writer asserts that treatment is simple, requiring two periods daily of iontophoresis of a half hour each. The ocular baths were given for six to eight hours without inconvenience to the patient. Sixteen cases of serpiginous ulcers and eleven cases of less serious corneal ulcers were treated and results summarized.

Some Ophthalmological Misconceptions in Medical Practice in the Philippines, Geminiano de Ocampo, M.D., *The Journal of the Philippine Medical Association*, November, 1949, Vol. XXV, No. 11, pp. 545–553.

One of the misconceptions dealt with in this paper is the belief that a patient must wait until a cataract is mature before it can be ex-

tracted. Removal of immature cataracts is not technically more difficult and visual results are equal to, if not better than, that of mature cataracts. This is based on the author's experience with 300 cataract extractions—103 were immature and 46 private cases with corrected postoperative vision were followed up. Of 30 uncomplicated cases, 87 per cent had vision of 20/20 to 20/30, while 95 per cent had vision of 20/50 or better. Glaucoma is the most frequent cause of irremediable blindness in the Philippines, and, to combat it, much education of both lay and professional people is needed. Other misconceptions concerning trachoma, virus keratoconjunctivitis, squint, ocular tuberculosis and vitamins, ophthalmic plastic surgery, eyestrain, and terminology are considered.

A Comparative Analysis and Limitations of Pseudo-Isochromatic Tests for Color Vision Testing, George P. Elmstrom, *The Optical Journal and Review of Optometry*, October 1, 1949, Vol. LXXXVI, No. 19, pp. 35–37.

According to this author, there is no sharp line of demarcation between the color defective and the normal; but, for reasons of safety and efficiency in modern society, it is necessary to distinguish the two. The best known tests used for this purpose are: Stilling; Ishihara; American Optical Company; Bostrom; Bostrom-Kugelberg; Rabkin; and Meyrowitz. Although no one test approaches perfection, the Bostrom-Kugelberg, the revised series of the American Optical Company, and the Rabkin are excellent from the standpoint of practicality. The pseudo-isochromatic tests, simple in construction, must be administered and interpreted correctly for valid results. Proper illumination is vital to the procedure, for which the Macbeth Easel Lamp is preferred to daylight, the latter being too variable. Although laboratory apparatus is more accurate than the pseudo-isochromatic tests, it is expensive, impractical and inconvenient. Correct interpretation of results from properly administered pseudo-isochromatic tests qualifies them as an efficient means of detecting color deficiency.

The Effect of Low Color Temperature Illumination and Red Illumination upon Subsequent Dark Adaptation, R. T. Mitchell, *Medical Research Laboratory Report*, Vol. 8, No. 146, pp. 27–38.

This highly technical study was undertaken to compare the use of red goggles or red illumination with the use of low color temperature illumination in accomplishing and maintaining partial dark adaptation. The author found that reducing color temperature of

adaptation brightness to 1950° K was decidedly inferior to red illumination of the same brightness. Such color temperature showed no appreciable advantage over white light of the same brightness so far as dark adaptation is concerned, and required additional current consumption.

A Battery of Pass-Fail Tests for Detecting Degree of Color Deficiency, Lieut. Comdr. Dean Farnsworth, Harry G. Sperling, and Priscilla F. Kimble, *Medical Research Laboratory Report,* Vol. 8, No. 147, 1949, pp. 39–68.

A battery of color vision tests was administered to an unselected sample of 1440 young males under standardized conditions, and approximately 10 per cent were found color defective.

The tests were evaluated for validity and reliability. It is expected that if the proposed battery of tests were applied to the U. S. population, the following percentages of degree of color deficiency would be found: normal color vision, 90 per cent; anomalous trichromats, 6 per cent; and dichromats, 2 per cent.

Sarcoidosis: A Review of 20 Cases, Joseph R. Vivas, M.D.; Harry A. Smith, M.D.; and Eugene C. Jacobs, M.D. *Bulletin* of the U. S. Army Medical Department, October 1949, Vol. 9, No. 10, pp. 829–837.

Twenty cases of pulmonary and mediastinal sarcoidosis were discovered by means of routine chest X-rays. All of these cases were proved to be sarcoidosis by biopsy of enlarged lymph nodes or of skin nodules. Sarcoidosis is a chronic, indolent and benign infectious disease of unknown cause with mild symptoms depending on the organ involved.

In this series four patients had ocular involvement, three with uveitis and one with keratitis. Two with uveitis and the one with keratitis were Negroes. The sputa of all these cases were consistently negative for tubercle bacilli. All of the eye cases had negative tuberculin tests and negative serology for syphilis.

Book Reviews

DISEASES OF THE EYE. Sir John Herbert Parsons and Sir Stewart Duke-Elder. New York: The Macmillan Company, 1948, Eleventh Edition, 732 p., ill.

The present edition of *Diseases of the Eye*, originally published by Sir John Herbert Parsons in 1907, has been revised and brought up to date by the original author with the aid of Sir Stewart Duke-Elder. Although the volume is comparatively small, its 732 pages are filled with valuable facts so clearly defined and practical that the average ophthalmologist should have a copy within easy reach for frequent reference.

The authors modestly state that every effort was made to retain the established character of the book as a safe, reliable, modern introduction to the diseases of the eye for students, general practitioners and junior ophthalmic surgeons. They have succeeded so well that they have created a valuable textbook which far exceeds anything produced in the United States of like character. The book is clearly and concisely written, well arranged and beautifully illustrated. A valuable appendix, outlining preliminary investigations of the patient, therapeutic notes and verbatim requirements for admission into the public services, is included. Few textbooks of our country contain the visual requirements for civil and military aviation, motoring, sailing and other regulated vocations. Parsons and Duke-Elder have provided complete regulations for public services in reduced print. Some of our enterprising authors and publishers might take a lesson from them when they revise our textbooks.

The slight differences in terminology and description are quite refreshing to the earnest student. We think of the cornea as having five definite layers, whereas the authors describe it as having only three. Such an interpretation is logical and may apply more consistently with the anatomical relationship to disease.

The following excerpts from the preface with reference to newer treatment and disease express the motives of the authors in their own words:

"The greatest revolution has occurred in chemotherapy; the value of the sulphonamide group of drugs particularly of penicillin has be-

come abundantly clear and they have now established themselves in the routine treatment of the great majority of infective diseases of the eyes. The treatment—and with it the whole clinical aspect—of many acute ophthalmias, for example, has changed; but it must be remembered that these drugs are not panaceas, that resistant cases occur, that chronic cases retain the habit of chronicity, and that even in the favorable cases their use will not compensate for the lack of good surgery nor provide a cover for inadequate therapeusis. For these reasons a knowledge of the well-tried classical methods of treatment remains essential and they have therefore not been omitted.

"New conceptions in neurology and pathology have involved several modifications and rearrangements, and the recognition of the ophthalmological implications of such infections as toxoplasmosis and brucellosis has led to their inclusion in the text."

Diseases causing blindness receive generous description as to etiology and management. The newer treatment of ophthalmia neonatorum is conservative and full use of antibiotics is employed. Glaucoma receives its share of attention and other devastating diseases are well described. Considerable attention is directed to routine ocular surgery, with illustrations.

This excellent revision of a popular treatise on diseases of the eye deserves the highest tribute and the publishers should see that it is well distributed throughout the world.

BRITTAIN FORD PAYNE, M.D.
New York, N. Y.

OCCUPATIONAL EYE DISEASES AND INJURIES. Joseph Minton, F.R.C.S. London: William Heinemann Medical Books, Ltd., 1949, 184 p., ill.

This book is virtually divided into two parts—the first nine chapters dealing directly with occupational eye diseases and injuries, and the remainder treating with the related problems of visual efficiency. The latter section includes discussions on visual selection and placement, the one-eyed worker, illumination, color, eye protection. While the two parts do have some bearing on each other, it would seem that for full handling they would better be separated and expanded into two different books.

Chapters I and II summarize the nature and extent of the problem in the "metal and engineering trades," to use the British term, meaning apparently all metalworking and processing operations including fabrication and foundry. In his use of statistics showing the proportion of eye cases to the total of reportable injuries, Dr. Minton faces the same difficulty that all investigators in the field meet—that of inade-

quate records. He notes that in the British figures only cases requiring more than three days of disability preventing the worker "from earning full wages for the work at which he was employed" are used in tabulations, and further that many millions of productive hours are lost by persons sustaining an eye injury resulting in lost time of any amount up to the three-day minimum. A ripe opportunity for statistical research exists here, and it may be that eventually complete records on eye disease and injuries will be available, but not until some really careful analysis is done.

Beginning with Chapter III, "Types of Eye Injuries," and continuing through IX, "Miner's Nystagmus and Eye Injuries at Coal Mines," Dr. Minton provides well-organized discussions of ophthalmological and pathological phases of his subject. Exact steps in clinical treatment for specific types of injury and disease are given. Doctors and nurses in industrial eye work, particularly those in British practice, will find the many case histories invaluable. Medico-legal factors relating to administration of English Workmen's Compensation and Common Law claims are well illustrated by the cases reviewed.

Acute and chronic occupational keratitis and conjunctivitis are thoroughly discussed in relation to specific industries in Chapter VI. Subsections include references on the problem as found in the artificial silk, rubber products, fur processing, upholstering, perfumery manufacturing, and chemical industries. Here suitable comment on prevention and control is supplemented.

An enlightening view of British industrial methods is developed in the chapter on the effects of radiant energy on the eye. If representative, it indicates that considerably more handwork is done there than in American establishments, and consequently the British experience will likewise show greater exposure to such eye difficulties as heat cataract and welder's flash. Mechanized operations and production methods in United States plants have introduced their own protection through segregating of hazardous jobs and through using continuous process and step-assembly arrangements. Dr. Minton uses detailed reference to the glassmaking and forging industries.

The sections on visual selection and placement, vision testing in industry, and the improvement of visual environment on the job also demonstrate that there is much room for progress in British practice. Apparently the new techniques that have been adapted in America during the past six or eight years on these, the visual efficiency factors in sight conservation and utilization in industry, are yet relatively untried in Britain. Still their need and general application are recog-

nized in the author's description, pointing the way at least, toward more complete programs in the future. A similar condition evidently exists in their development and use of personal protective equipment in the prevention of eye injuries. For example, corrective-protective devices, widely used in the U.S.A. for nearly every type of exposure where the worker requires refractive correction in his safety glasses, are not recognized as generally acceptable in English industry, according to Dr. Minton. Mainly they depend on face "masks," cup goggles, and simple spectacle goggles for protecting the worker, and these as secondary to guarding of the job.

Industrial ophthalmologists, nurses and others will find in this book much helpful data and case record information on eye diseases and injuries as related to the patient's occupation, but there are also many problems which are not discussed by Dr. Minton. This is due to the fact that it would be impossible in a brief 184-page handbook to cover every situation, and certain phases of a given subject must be left to individual understanding through generalization and development of broad principles.

Finally, it should be noted that Dr. Minton has concluded, as many other observers have, that "ophthalmologists should acquaint themselves with the working conditions in the factories; it would often enable them to find a cause for the patients' diseases of the eyes."

ROBERT S. KRUEGER
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CHILDREN'S EYE NURSING. James Hamilton Doggart, M.A., M.D., (Contab.) F.R.C.S. London: Henry Kimpton, 1948, 144 p., ill.

The author has written this book essentially as a supplement to the nurse's practice and experience in eye nursing. From his experience with nurses, the author concludes that they have difficulty in understanding the anatomy of the eye and he tries to clarify this subject for them. The anatomical structure of the eye is well described, with sufficient illustrations to make the discussion extremely valuable. I believe this is one of the strongest features of the book.

The space devoted to "Children's Eye Nursing" is not sufficient to permit any detailed discourse and, therefore, many subjects are treated superficially. An example of this is Chapter 12, which deals with the care of school children. In this particular chapter, no mention is made of vision testing or its place in a school program. The measuring of visual acuity is discussed quite briefly in Chapter 5, under "Errors of Refraction," but the subject itself would merit a great deal

more attention. This brief discussion will not be too helpful to the nurse who has had no experience with vision testing.

It is the author's hope that the book will assist the nurse to understand each new experience with eye cases in the out-patient department and that it will help her to crystallize more clearly the vague and weak teaching on various eye conditions which she experienced during her student training.

This book has limited value except for the experienced eye nurse who has a fair understanding of eye care and is looking for limited reference material to strengthen special points. The hospital nurse will find the book useful, since it has a fairly good description of the instruments used in various operations and the care of these instruments. The book is written entirely from a medical point of view with little reference to the public health or positive health aspect.

HELEN E. WEAVER, R.N.
National Society for the Prevention of Blindness

MODERN PRACTICE IN OPHTHALMOLOGY, 1949. Edited by H. B. Stallard. New York: Paul B. Hoeber, Inc., 1949, 525 p.

Written by fourteen well-known British ophthalmologists, this text is intended as a guide to the general practitioner. The subject matter is well organized and up to date except for certain omissions which American readers will note. There is no mention of retrolental fibroplasia nor of streptomycin. In discussing treatment of trachoma, Somerville-Large says, "The value of the sulphonamides is not yet definitely proved . . . ," a surprising statement in view of their success in this country.

Doggart's chapter on the cornea is particularly good. In addition to describing all the common conditions, he reminds the general practitioner that glaucoma must never be forgotten as a possible explanation of corneal haziness. Stallard's discussion of the symptoms of acute congestive glaucoma should be useful in helping to avoid a wrong diagnosis of "bilious attack" or of intestinal obstruction.

At times the British style of writing is truly memorable: "Not a few eye accidents are the outcome of such anniversaries as Guy Fawkes' Night, the Lord Mayor's Show and others in which the untimely investigation of a firework possessed of a latent period of activity terminates the enquiry in an unpleasant manner. A venerable male retainer attended hospital with a perforating wound and a traumatic cataract inflicted by a hatpin passed through the keyhole of a door."

The typography is good and the illustrations are excellent.

BLAKISTON'S NEW GOULD MEDICAL DICTIONARY, First Edition, Edited by Harold Wellington Jones, M.D.; Normand L. Hoerr, M.D., and Arthur Osol, Ph.D.; with the cooperation of an Editorial Board and 80 contributors, Philadelphia; Blakiston, 1949. 1294 p., ill.

Congratulations and thanks to the Blakiston Company, Philadelphia, for publishing the *New Gould Medical Dictionary* in clear, bold visible type. No longer is it a visual chore to try to locate the meaning, spelling or pronunciation of almost any medical term we are seeking. The book undoubtedly is all that it claims for itself—"a modern, comprehensive dictionary of terms used in all branches of medicine and allied sciences, including medical physics and chemistry, dentistry, pharmacy, nursing, veterinary medicine, zoology and botany, as well as medicolegal terms; with illustrations and tables."

Many of the contributors are from Western Reserve University, Cleveland, Ohio, and Lorand V. Johnson, M.D., associate professor of ophthalmology of the School of Medicine of that University, is the contributor in the field of ophthalmology. The only recent term we looked for and could not find was "retrolental fibroplasia," which is being used frequently in present-day ophthalmic literature. Perhaps a later edition will include it.

This Dictionary will be welcomed by nurses, medical social workers, and representatives of other nonmedical professions, as well as by the physicians themselves. It certainly is a boon to medical writers.

THE EYE AND ITS DISEASES, edited by Conrad Berens, Second Edition: W. B. Saunders Company, 1949. 1092 p.

In this comprehensive single volume, 92 international authorities have written a clear and timely account of all phases of ophthalmology, reflecting the broad interests of its distinguished editor. Advances made in the thirteen years since the first edition are included, as well as new chapters on light and lighting by Lancaster, physiologic chemistry by Krause and gonioscopy by Troncoso. Gradle's excellent chapter on glaucoma has been revised by Duke-Elder to include recent developments in diagnosis, treatment and theories as to etiology. The chapters on hygiene of the eyes by Knighton and on prevention of blindness by Hathaway are of special interest to everyone engaged in sight conservation.

EYE, EAR, NOSE AND THROAT MANUAL FOR NURSES. Roy H. Parkinson, M.D., F.A.C.S., St. Louis: C. V. Mosby Company, 6th edition, 1949, 253 p., 82 ill., 2 in color.

The 6th edition of Dr. Parkinson's book does not differ materially from previous editions. The book is divided into three parts, the first of which is specifically designated as a treatise for classroom use by undergraduate nurses. The second part is intended as a guide in operating room technique, and the third is designed as a guide for the public health nurse.

The first part, which includes the anatomy and physiology of the eye, is clear, brief and should be of considerable help to the student nurse. The second part, devoted to operating room technique, describes the instruments to be used and outlines procedures for the various operations. The third part, designed for the public health nurse, falls far short of the purpose for which the author intended it. The section on eye health is somewhat confusing and does not give enough of the underlying principles or specific procedures that should be carried out. Only a few of the problems encountered by the public health nurse are discussed, and neither reference material nor a specific plan is provided which the nurse working along would follow. The book appears to be a purely technical treatise of selected eye conditions from a medical viewpoint. There is very little reference to actual nursing procedures.

The strength of the book lies in the presentation of the anatomy and the physiology of structures and the necessary equipment for operating room procedures. It fails to provide any postoperative nursing procedures for eye conditions nor is there any attempt to treat the patient as an individual. The public health procedures should be incorporated throughout the book and not assigned to a separate treatise. The book would appear to have limited value for nurses engaged in hospital activities or those interested in a brief review of the anatomical structures.

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